DOCUMENT RESUME

ED 157 461 HE 010 298

TITLE	Report on Teaching: 6. Interdisciplinary Studies.
INSTITUTION	Change Magazine, New Rochelle, N.Y.
PUB DATE	Aug 78
NOTE	75p.
AVAILABLE FROM	Change Magazine, NBW Tower, New Rochelle, N.Y. 10801
EDRS PRICE	MF-$0.83 HC-$3.50 Plus Postage.
DESCRIPTORS	American Studies; *College Instruction; *Educational Innovation; Engineering; Environmental Education; Futures (of Society); *Higher Education; Humanism; Humanities; *Interdisciplinary Approach; Professional Education; Program Evaluation; Skill Development; *Teaching Techniques; *Undergraduate Study
IDENTIFIERS	*National Teaching Project; Temple University PA; University of Wisconsin Green Bay; West Virginia University; Xavier University OH

ABSTRACT

This, the sixth and last Report on Teaching of "Change Magazine's" National Teaching Project, reviews the state of interdisciplinary studies in U.S. undergraduate study. Articles and authors included are: "An Integration of Knowledge and Experience" (Earl J. McGrath); "Interdisciplinary Studies: A MAtter of Definition" (L. Richard Meeth); "A Guided Tour of the Academic Mind" (Evan Jenkins); "Exploring the Shape of American Culture" (Stan Luxenberg); "The Greening of an Engineer: Humanism and the Erie Canal" (Liva Baker); "Exploring the Shape of American Culture" (Stan Luxenberg); "From Concrete to Abstract Reasoning: SOAR Plots the Course" (C. Eric Lincoln); "A Thematic Approach to Concerns of the Future" (Nathaniel Sheppard, Jr.); "Fine Tuning the Student Consciousness" (George W. Morgan); "Redistributing the Responsibility for Learning" (Peninan Glazier); "Tracking Civilization of Gentrain: Snapshots of Global History" (Phillip C. Nash); "A Humanistic Perspective on the Professions" (Ronald A. Carson); "Law and Justice Studies: Built on a Firm Foundation" (Robert Swartz); "A Program for Integrative Education: Satisfying the Search for Unity" (Gerald R. Bakker); and "Rachel Carson College: A Breath of Fresh Air for Environmentalists" (Peter Gold). An evaluation of "Change's" National Teaching Project is also included. (LBH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED157461

From the editors of

Change

The Magazine of Learning

6 REPORT ON TEACHING

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

HE 010 298

ANALYSES OF SOME OF THE MOST NOTABLE IMPROVEMENTS IN AMERICAN UNDERGRADUATE TEACHING

AN EVALUATION OF CHANGE'S NATIONAL TEACHING PROGRAM

ABOUT THIS NATIONAL TEACHING PROGRAM

Beyond the often confusing currents and crosscurrents that now move higher education, there emerges one most urgent question: What can half a million academic professionals do for eleven million college students that will most benefit their growth and that of humanity as well? The question beckons ever more urgently, given the increasing divergence between faculty and student expectations and public disenchantment with the quality of education.

Change's National Teaching Program, which in the last three years has publicly addressed itself to the issue of effective teaching, has released considerable synergistic energies. Being a broad-spectrum approach to America's professoriat as a whole, it could not of course exert at the same time an intense laser impact on any single member of the faculty. Thus, this most visible approach to improved teaching exhibited strengths and weaknesses. Both are well documented in the assessment of this project, published here, which was conducted by an independent team of academic researchers. Their evaluation makes interesting reading and could hold important lessons for the future.

The lasting effects of this teaching project are not likely to be known for some time. But there is no doubt that historic forces will produce new pressures to make effective teaching a more central academic activity. What can also be expected are pressures for a renewed sense of inventiveness and flexibility on the part of faculty everywhere. Whatever its final value, this National Teaching Program is but a forerunner of other efforts—both local and national—that seek to generate some larger sense of dynamism in a period of generally reduced enthusiasm. The degree to which academic institutions can energize their teaching forces will in large measure determine their eventual survival, even though these connective tissues are still only too dimly recognized.

—George W. Bonham

TEACHING PROJECT ADVISORY BOARD

Kenneth E. Eble
Chairman, Committee on Teaching
American Association of University Professors

Stanford C. Ericksen
Center for Research on Learning and Teaching
University of Michigan

Jerry C. Gaff
Project on Institutional Renewal Through the Improvement of Teaching
Society for Values in Higher Education

James B. Maas
Department of Psychology
Cornell University

Sheilah Koeppen Mann
Division of Educational Affairs
American Political Science Association

Hans O. Mauksch
On Teaching Undergraduate Sociology
American Sociological Association

Wilbert J. McKeachie
Center for Research on Learning and Teaching
University of Michigan

Paul L. Ward
Executive Secretary Emeritus
American Historical Association

STAFF

Project Director
Joan L. Stableski

Program Consultant
L. Richard Meeth

Administrative Associate
Jeanne M. Cella

Editor-in-Chief
George W. Bonham

Managing Editor
Margaret E. Bailey

Articles Editor
Joyce Bermel

Associate Editor
Matthew Soyster

Director of Special Projects
Robert A. Miller

Contributing Editors
Molly Katz
Abigail Zuger

Publisher
Deanna Maneker

Art Director
Dennis Hermanson

Compositor
Mary A. Lucas

Accounts Manager
Joyce Margarita Walsh

Administrative Assistant
Eileen M. Duigan

Circulation Manager
Faith Silver

BOARD OF TRUSTEES

Winfred L. Godwin, Southern Regional Education Board, Chairman
Vernon Alden, Massachusetts Governor's Foreign Business Council
James H. Billington, Woodrow Wilson International Center for Scholars
John Brademas, United States Congress
Stephen R. Graubard, Daedalus
Francis Keppel, The Aspen Institute
Clark Kerr, Carnegie Council on Policy Studies
F. David Mathews, University of Alabama
Jane C. Pfeiffer, Greenwich, Connecticut
Frank Stanton, American National Red Cross
Jerome M. Ziegler, Cornell University

This Report on Teaching is made possible by the Fund for the Improvement of Postsecondary Education.

The material is not copyrighted. Teachers and administrators are encouraged to make use of it.

This Report on Teaching is Number 7, Volume 10 (August 1978) of *Change* Magazine, which is published monthly by the Council on Learning, a public corporation. Professional subscription rate $18 a year in USA, $22 for others. Add $3.00 per year for foreign subscriptions including Canada. Student rate $12 a year. Address all editorial correspondence, subscription orders and inquiries to *Change* Magazine, NBW Tower, New Rochelle, N.Y. 10801, or call (914) 235-8705. For change of address allow four weeks' notice and include both new address and address label from latest issue. *Change* Magazine is microfilmed by University Microfilms, Ann Arbor, Mich. 48106. International Serial Number 0009-1383. Printed in the USA by the Lane Press, Burlington, Vt. Second-class postage paid at New Rochelle and additional mailing offices.

REPORT ON TEACHING: 6

Interdisciplinary Studies

6 AN INTEGRATION OF KNOWLEDGE AND EXPERIENCE, Earl J. McGrath, Executive Director, Program in Liberal Studies, University of Arizona

10 INTERDISCIPLINARY STUDIES: A MATTER OF DEFINITION, L. Richard Meeth, Program Consultant, National Teaching Project

11 A GUIDED TOUR OF THE ACADEMIC MIND, Evan Jenkins
In a course called The Nature of Evidence, a philosopher and an engineer use Guided Design, a structured attack on open-ended problems, to introduce students to the thought processes of scholars of all persuasions. Gene A. D'Amour, West Virginia University.

15 THE GREENING OF AN ENGINEER: HUMANISM AND THE ERIE CANAL, Liva Baker
Recognizing the need for humanistically literate technologists, Worcester Polytechnic Institute offers its future engineers a grounding in the liberal arts that includes independently developed interdisciplinary projects. William R. Grogan, Worcester Polytechnic Institute.

20 EXPLORING THE SHAPE OF AMERICAN CULTURE, Stan Luxenberg
Within a carefully crafted series of courses that examine the nation's culture, Temple University offers American Studies students internships in museums and civic organizations—and opportunities to be chroniclers of history. Miles Orvell, Temple University.

25 FROM CONCRETE TO ABSTRACT REASONING: SOAR PLOTS THE COURSE, C. Eric Lincoln
Bothered by the high attrition rate in science and mathematics courses, faculty at Xavier University have fashioned a Piagetian-based strategy to help students develop the cognitive skills essential to their academic and vocational success. JW Carmichael, Jr., Xavier University of Louisiana.

30 A THEMATIC APPROACH TO CONCERNS OF THE FUTURE, Nathaniel Sheppard, Jr.
Composed of four colleges organized around environmentally related themes, the University of Wisconsin-Green Bay provides a curriculum in which problems of the future are studied from social, cultural, and aesthetic perspectives. David M. Littig, University of Wisconsin, Green Bay.

34 FINE TUNING THE STUDENT CONSCIOUSNESS
George W. Morgan, Brown University

36 REDISTRIBUTING THE RESPONSIBILITY FOR LEARNING
Penina Glazer, Hampshire College

38 TRACKING CIVILIZATION ON GENTRAIN: SNAPSHOTS OF GLOBAL HISTORY
Philip C. Nash, Monterey Peninsula College

40 A HUMANISTIC PERSPECTIVE ON THE PROFESSIONS
Ronald A. Carson, University of Florida, Gainesville

42 LAW AND JUSTICE STUDIES: BUILT ON A FIRM FOUNDATION
Robert Swartz, University of Massachusetts at Boston

44 A PROGRAM FOR INTEGRATIVE EDUCATION: SATISFYING THE SEARCH FOR UNITY
Gerald R. Bakker, Earlham College

46 RACHEL CARSON COLLEGE: A BREATH OF FRESH AIR FOR ENVIRONMENTALISTS
Peter Gold, Rachel Carson College, State University of New York at Buffalo

2 THESE REPORTS ON TEACHING: PROGRESS AND PROSPECTS, Joan L. Stableski

3 ON THE VALUE OF GOOD TEACHING: THE VIEW FROM THE DISCIPLINES

Evaluation of the Teaching Project

49 AN EVALUATION OF CHANGE'S NATIONAL TEACHING PROJECT, J. Bruce Francis and Associates

THESE REPORTS ON TEACHING
Progress and Prospects

This, the sixth and last Report on Teaching, marks the end of *Change*'s National Teaching Program. It has been a productive three years and, judging by the requests for the Reports and the other program publications, the materials produced have been of interest—and hopefully of use and benefit—to the academic community.

A litany of thanks is in order to those who have made the program possible. Without their creativity, concern, and support, the magnitude and quality of the work would have been markedly less. First and foremost, a hearty measure of appreciation is due the Fund for the Improvement of Postsecondary Education. It is not enough to say that their support was what brought this program into existence. FIPSE holds a special place among the crowd of federal agencies. Its uniqueness is not solely a factor of its relatively modest size but derives from the genuine commitment by a cadre of young professionals to improving the quality of education. David Justice, the program officer in charge, was ready with advice and support whenever needed, while at the same time allowing the program to breathe and stretch freely within the bounds of the practical.

Just as the funding was crucial, so too was the person who molded the suggestions of many into a cogent, workable proposal. Although he might find it inappropriate to be acknowledged within the pages of this magazine, George W. Bonham, *Change*'s editor-in-chief, deserves the highest acknowledgment both for his role in turning an idea into a reality and for his sensitive guidance throughout. L. Richard Meeth, director during the first two years, gave the program its philosophical structure, developing the working definition of improved teaching and the criteria for selection of courses. His knowledge of higher education was essential and his abilities as a manager started a complex project off on its relatively smooth course.

There were other essential components too: the willingness of the disciplinary associations to commit their resources and energies to identifying some of the best teachers in their fields; the thoughtful critiques by the members of an exceptionally serious and active advisory board; and the individuals across the country who distributed the Reports within their institutions.

Perhaps the highest accolade belongs to the faculty featured in the Reports. They may appear to have played a passive role, but actually they opened themselves to an intense cross-examination concerning their values and attitudes about teaching. And the willingness to publicly affirm an overriding concern for good teaching can be costly. The response of their more research-minded colleagues proved not always to be sympathetic.

As has happened often over the last three years, a professor called to tell of the reactions to the article about her work. Her comments had a familiar ring: "There's been a good deal of response," she said, "but it hasn't all been good." Letters from across the country, requests for information from faculty in disciplines far afield from her own, and words of congratulations from the local president and dean constituted the better half. But her own department denigrated the engendered publicity. In the powerful language of peer pressure, they communicated to her that the appropriate role for a serious member of the faculty was to concentrate one's energies on research. She needed the assurance of anonymity to discuss the situation, "Otherwise I'll end up getting tenure at Podunk College." I see no way of labeling this kind of treatment anything other than petty and unprofessional. That it exists in any form must surely be an embarrassment to the academy.

For all its inherent worth, scholarship within the context of undergraduate education comes alive most forcefully when it is effectively communicated to those the institution serves—its students. And as colleges and universities begin to scramble for the now declining number of traditional consumers of higher education—and seek to entice the more nontraditional—they will need increasingly to respect the teaching skills of the professional as well as his or her disciplinary mastery and strive to achieve a peaceful and creative union of the two.

The skills required of a good teacher must of course not be divorced from the act of scholarship. In higher education, the first pride in professional accomplishment leans naturally toward mastery of subject matter and the excellence within a corner of a discipline that takes years to achieve. But the point that has been made often and more eloquently elsewhere seems to need restating: There is room within higher education for both good teaching and good research not only to live amicably side by side but to complement and sustain each other.

—John L. Stableski

ON THE VALUE OF GOOD TEACHING

The View From the Disciplines

How do the disciplinary associations view undergraduate teaching and its improvement? What specific challenges are they facing? As an acknowledgment of the central role of the disciplines in the success of Change*'s National Teaching Program, the participating associations were asked to respond to these questions in a public statement of their interest in and commitment to teaching.*

GEOGRAPHY

In the past decade several national projects sponsored by the Association of American Geographers have focused on content and method as the important areas for improving geography teaching. The AAG's Commission on College Geography examined course content in the larger context of the liberal arts, recommending new approaches and materials. Two other AAG projects, sponsored by the Commission on Geographic Education and the Teaching and Learning in Graduate Geography Steering Committee, examined teaching as a function of a teacher's attitude and behavior rather than simply a search for new materials or modes. Both projects provided an opportunity to approach improvement as a research exercise, i.e., as a continuous learning process. As in research, the difficulty lies in transforming what teachers learn about their teaching into skills that will improve their own and students' learning.

Salvatore J. Natoli
Educational Affairs Director
Association of American Geographers

BIOLOGY

The most important issues in higher education relate to a severe downturn in traditional student populations that will begin around 1982 and extend through the 1990s. This as well as changes in the mandatory retirement age will reduce the input of fresh new ideas in teaching that are often the by-product of young teachers entering the profession. To partially offset these trends we need to concentrate more effectively on serving a broader clientele. It should include, of course, the educationally and economically disadvantaged, women, and older students. In particular, we need to devise new strategies and instruments for the education of individuals already serving in trades and professions in order to update their technical knowledge and certification and also to introduce them to the broader liberal arts subjects that will give them greater satisfaction and enjoyment in their retirement years.

Paul G. Pearson
President
American Institute of Biological Sciences

LANGUAGE

Perhaps the most significant development in English has been a broadened definition of the field: No longer merely the literary history and criticism of selected British and American masterpieces, it is coming to mean the study of how to create or interpret a written text—whether the text be a freshman theme, a business report, a Shakespearean play, or a contemporary novel. Similarly, in foreign languages we have gone beyond formalities and mechanics and are concerned with national cultures, with the expression of culture through language, and with communication across cultural lines for a multitude of purposes.

Richard I. Brod, Director
Foreign Language Programs
Jasper P. Neel, Coordinator
Association of Departments of English
Modern Language Association

PHYSICS

Although physics research in the U.S. continues to thrive, the federal government has reduced its support of research physicists. Furthermore, high school and college enrollments are likely to decrease during the 1980s. Thus the traditional reasons for encouraging students to study physics—to do research and to teach—are less compelling than in the past. Physics teachers are therefore challenged to identify new reasons for studying physics and new sources of physics students. With this stimulus, innovative courses, instructional materials, and teaching methods are being designed and tested. The primary task for the immediate future is to determine which of the new goals truly contribute to a better society and which teaching procedures are most effective in achieving those goals.

A.A. Strassenburg
Executive Officer
American Association of Physics Teachers

MATHEMATICS

Collegiate mathematics curricula have been strengthened significantly in the past decade. Graduate schools increasingly emphasize teaching in the training of PhDs; even the established mathematics faculty is reexamining its bag of classroom tricks. Current priorities include the improvement of courses for students destined to become users rather than developers of mathematics. A recent conference sponsored by the Mathematical Association of America produced some 25 recommendations designed to improve the content and teaching of collegiate mathematics in the next decade. These will be publicly reported in MAA journals in fall 1978. On another front, MAA recently appointed a Committee on the Teaching of Undergraduate Mathematics. It has produced two pamphlets scheduled for fall publication: *College Mathematics: How to Teach It* and *Training Programs for Teaching Assistants in Mathematics*. These activities have given us a start in the direction of improving teaching.

A.B. Willcox
Executive Director
Mathematical Association of America

PHILOSOPHY

While great teachers are like great orchestra conductors—both have an almost magic quality—all teachers can become better than they are through effort. However, effort alone may make only a small difference if it is relatively uninformed. Thus those who teach, whether or not they consider themselves primarily teachers, must have access to a range of information about teaching. Some of this can be gained through personal contacts, but as with scholarly research one's friends cannot be expected to supply all of the information one should have. Therefore substantial effort should be made to encourage the publication of materials that will fulfill this function.

John O'Connor
Executive Secretary
American Philosophical Association

SOCIOLOGY

Sociologists, in keeping with their disciplinary orientation, have traditionally assigned the highest value to research activities. Considerably less value has been assigned to teaching, which has been considered an art rather than a science. Recently, the American Sociological Association's Projects on Teaching Undergraduate Sociology have questioned this value system, arguing that (1) research and teaching can be mutually supportive; (2) research in sociology, psychology, and education is providing a more scientific basis for teaching; and (3) content area expertise is necessary but not sufficient for effective teaching. Resolution of the primary conflict between teaching and research will affect the outcome of several associated issues: the graduate training of sociologists, the rewards and prestige assigned to teaching, the functioning of departments, the careers of sociologists, the level of institutional support required, and the manner in which sociology is taught.

Russell R. Dynes
Executive Officer
American Sociological Association

ECONOMICS

In the last 20 years, research on economics education has advanced from base zero to a recognized specialty within the economics profession. The idea that research on teaching problems can be fruitful is slowly gaining acceptance. Economics education does not have as much prestige as other subfields an economist can specialize in, and the amount of high quality research that has been done in it is still limited. But the field is developing to the point that economists no longer think decisions on teaching should be based solely on casual empiricism and intuitive judgments. The trend toward more and better research on this subject can be expected to continue.

Kendigs Fels
Treasurer
American Economic Association

CHEMISTRY

As it emerges from what might fairly be called a golden age of progress and achievement, American higher education finds itself beset by problems that seem unprecedented in their scope and intensity: a sharp drop in governmental support that has already harmed graduate education and research; declining enrollments, which are forcing many colleges to close or retrench; and a tight job market that has virtually eliminated the influx of young faculty with their sorely needed fresh outlook and new ideas. We have the resources, the skills, and the imagination to deal with these issues. What is needed is a recognition by all concerned—academics, government administrators, and the public—that the problems can and must be solved.

Raymond P. Mariella
Executive Director
American Chemical Society

MUSIC

The most important issues concerning the improvement of teaching include finding ways in which we as individuals and as a profession can: (1) Learn more about the teaching-learning process as it applies to the diverse cognitive, affective, and psychomotor aspects of music learning. (2) Insure that our curricula are comprehensive and that they are directed toward the needs of citizens in a pluralistic society. (3) Insure that music instruction is available to all and that we meet the special needs of preschool children, adults, the handicapped, the disadvantaged, and the gifted. (4) Insure that teacher education programs produce highly qualified and competent musicians who are knowledgeable in the most efficient instructional techniques and resources. (5) Continue to offer comprehensive and balanced programs of high quality in music and the arts in all schools in the face of program cutbacks and financial adversity.

Paul Lehman
Chairman, National Committee on Instruction
Music Educators National Conference

INTERDISCIPLINARY STUDIES

An Integration of Knowledge and Experience

by Earl J. McGrath

The term "interdisciplinary" has been misused and misconstrued in educational discussions for more than half a century. If we go by etymology, "inter" means between or among, and "disciplinary" implies two or more studies. The unfortunate combination of the two has generally been used to describe a variety of curricular patterns that have little in common. To convey the notion of genuine interdisciplinary work, the word "integrated" might be more appropriate because it connotes wholeness. This is no finicky debate over educational terminology. If interdisciplinary studies are to achieve their proper educational objectives, a sense of integration must be provided.

In deciding what constitutes a sound interdisciplinary approach, it is important to ask why early efforts that aimed at improving general undergraduate education failed. What kinds of interdisciplinary approaches have been designed over the past half century, and what were their strengths and weaknesses? Consider the reasons for developing a more adequate general education program in the first place.

As the late James B. Conant pointed out when he was president of Harvard 30 years ago, undergraduate education had become so specialized that it failed to educate youth to understand themselves and the world in which they lived. He and the Harvard committee that wrote *Education for a Free Society*, the so-called Redbook, therefore proposed "broader, more inclusive, thematic sets of courses in the various major divisions of knowledge." Harvard launched several such programs in the social sciences, the physical sciences, and the humanities, and numerous other institutions adopted roughly similar curricular arrangements. Conant himself was so intensely interested in the new approach that, in addition to his presidential duties, he taught a one-semester interdisciplinary course in the sciences each year. For reasons of space, one example must suffice to explain the differences between typical elementary courses and the more general courses Harvard proposed. In science the new courses would not offer the student bits and pieces of elementary physics, chemistry, or biology, nor would they cover all the preparatory material for future instruction in the sciences. Instead, they would integrate several of the sciences around themes or major breakthroughs to make science meaningful to the students.

In some ways the Harvard program was successful; students liked most of the general courses and a modest percentage of the faculty participated with considerable enthusiasm. In the minds of the faculty as a whole, however, the program was unsatisfactory. It took students from their specialized courses and conflicted with the traditional systematic treat-

EARL J. McGRATH is executive director of the Program in Liberal Studies at the University of Arizona. He is the author of two monographs published by the Lilly Endowment: Values, Liberal Education, and National Destiny and General Education and the Plight of Modern Man. Dr. McGrath is a former U.S. Commissioner of Education.

ment of subjects. With the onset of the war, Conant turned his attention to more immediate concerns, such as the Manhattan Project and the construction of the first atomic bomb, and disaffection with the program arose. It is significant, however, that the idea never died. Since 1971, Harvard committees have been at work on a new core curriculum in general education that has now been approved and will probably go into effect in fall 1979.

Several other kinds of interdisciplinary work were also attempted. A program adopted in the early 1930s by the University of Chicago and St. John's in Maryland was largely the brainchild of Robert M. Hutchins and his associates. It consisted of a prescribed set of thirteen courses extending over the entire four college years. All students took the same courses, or, if they were prepared, took an examination without preliminary instruction. Though not the most popular program in the country, this was by far the most controversial. It offered none of the usual highly specialized majors. The chief objective was not to turn out mathematicians, historians, or psychologists, but educated men and women who, through acquaintance with the great works of all time and cultivation of the "intellectual virtues," would be equipped to lead intelligent personal and civic lives.

This program could hardly have been expected to succeed. Specialists in the various disciplines, particularly in the sciences, called it superficial; it was described as out of date because it stopped with Freud. And because of its emphasis on the classical literature, it was avoided by students (and parents) with strong vocational motivation. On the positive side, it had a unity and an agreed upon set of purposes, and among many students and some faculty it commanded fanatic dedication. Moreover, many institutions adopted similar programs, particularly in their humanities departments, which have endured through the years. Furthermore, many single elementary courses have embraced Hutchins's selection of texts and his emphasis on intellectual activity and criticism in place of the routine ingestion of unmasticated facts.

The largest percentage of interdisciplinary courses developed by the colleges, however, involved no real merging of subject matter except in the catalog. Such courses were labeled "General Science" or "Introduction to the Social Sciences." They represented no new consideration of the purposes of a college education in terms of the needs of today's world. They were largely grudging concessions to the radical reconstructions advocated by such towering figures as Conant and Hutchins. The most common way to accept their challenges without departing too widely from conventional elementary instruction was to take units of study from a number of disciplines (say physics, chemistry, geology, and biology) and assemble them into a collection of tenuously related subject matter blocks.

This approach was interdisciplinary only in the sense that representatives of the various faculties agreed on the units of instruction, which would run in sequence for a period of weeks. The courses served up separate slices of subject matter, with the largest slices usually going to the most powerful departments. The chief purpose of interdisciplinary work—to integrate relevant knowledge around a significant issue—was ignored, often because faculty members didn't know enough about the related subjects to shape an integrated course. It is amusing to read the catalog announcements and realize that students were assumed to have an awareness of interrelationships that the faculty members themselves disregarded.

At Iowa, as elsewhere, inimical faculty members properly charged that providing the students with fragments of instruction from several disciplines resulted at best in little knowledge of subject matter, of how knowledge was derived, and of its impact on the human enterprise. Such a general education program was in no real sense interdisciplinary, and at the first opportunity the leaders in the sciences and in other departments as well began earnest attempts to disassemble the courses. They restored the conventional elementary courses designed to suit the needs of majors and the specialized interests of faculty.

Interest in and support for creative interdisciplinary courses would doubtless have continued in any case had it not been for a world event that bolstered the cause of specialized intellectual interests. The death blow for integrated courses, particularly for nonmajors, was the Russian launching of Sputnik. It was alleged that Sputnik dramatically demonstrated how far behind the Soviets we had fallen in science. The immediate cry was for large amounts of federal funds to support the research and development needed to regain American superiority. In such an emergency, it was argued, the nation could hardly afford to employ valuable academic personnel to teach ordinary students about the meaning of science for the average citizen. Nonscientific disciplines joined the chorus, so that many experimental curricular adventures in other fields were also abandoned. The traditional major system assumed control again.

In the sixties, other efforts emerged here and there. Some of them—like the environmental college at the University of Wisconsin, Green Bay, or the cluster colleges at the University of California, Santa Cruz—are still with us. But many were chaotically put together in response to student demand, and these foundered. The college curriculum of the seventies settled back into the conventional major-elective pattern. Where any concern for general education did exist, the spread of learning was assumed to be acquired through the distribution system.

At this stage in our history, viewing the collapse of earlier efforts to relate knowledge to human problems, what reasons can be found to hope for greater success today? There are several.

The fact that prestigious faculties like those at Harvard and Berkeley are asking questions about the purposes and character of higher education offers hope that some serious thought will now be given to the kind of higher education intelligent young people will need in the years ahead. It is also significant that *Educating for Survival* by U.S. Commissioner of Education Ernest Boyer and Martin Kaplan should have been published at this critical moment, since it argues for a broader education directed at the key human issues of our time.

Furthermore, the world has changed extensively in the past 30 or 40 years. There is a general unease among Americans as we seek to deal with problems individually and collectively. We continue to be committed to the conviction of our national founders that widespread education is the only effective instrument for bringing about social and political reforms. But we are much more inquisitive about the kind of education that will make such reforms possible. Students may want to take courses and programs that will assure them of jobs, but they also want educational institutions to help their generation deal with crime, pollution, political corruption, unemployment, inflation, and a host of other equally pressing matters of social policy. The critical attitude of citizens generally will require the profession to conduct an incisive review of current educational policies and practices.

Many thoughtful citizens inside and outside the profession are genuinely concerned about what changes need to be made, especially in education, to preserve our way of life, or better still to establish a more durable one. The late Jacob Bronowski put our future in historical perspective when he said:

> The ascent of man will go on. But do not assume that it will go on carried by Western civilization as we know it. We are being weighed in the balance at this moment. If we give up, the next step will be taken—but not by us. We have not been given any guarantee that Assyria and Egypt and Rome were not given. We are waiting to be somebody's past, too, and not necessarily that of our future.

It is obvious that we need to vigorously pursue programs of research and specialized advanced teaching. More urgent, however, is that the general citizenry be broadly educated with respect to national goals and personal value choices. Only courses that bring integrated knowledge to bear on present problems can achieve these goals. A collection of predigested facts unrelated to the human condition will not be of much assistance, and our more sophisticated youth will not accept this intellectual diet. Our vast array of knowledge needs to be reexamined, reworked, and recast to suit the intellectual, social, and ethical needs of our time.

It will take a radical change in attitude among the

professoriat to bring this about. Today the younger members of the profession tend to be more amenable to such undergraduate reforms than they were only a few years ago. If the tight labor market does not keep them out of the university, they will attempt the reconstructions needed to vitalize undergraduate courses and to make them germane to a swiftly changing democratic society.

But any efforts at undergraduate reform that begin by juggling units of subject matter will be futile. The way to begin creating a course is to identify the major social, personal, and civic problems of the day. The process can be carried on more effectively if both laymen and professionals take part because the former think about actual situations while the latter tend to concentrate on subject matter. Knowledgeable persons from both areas could quickly make a list of the dominant issues that must be dealt with if our society is to survive. These involve long-range energy and population concerns as well as domestic worries over inflation and unemployment.

Once the topics are decided, respresentatives of various departments should assemble to determine what elements of their disciplines could shed light on the themes under study. Take the matter of crime. It might make sense to analyze the elements in the lives of individuals and in society at large that relate to criminality and its causes. An abundance of data already exists on this subject, and in most institutions or communities faculty can offer a wide range of informed opinion. Sociologists, psychologists, economists, political scientists, chaplains, and nutritionists could all make obvious contributions to the design of a comprehensive program dealing with crime and its causes and cures. The humanities, too, should be included, for what student of criminal behavior would not benefit from a reading of *Crime and Punishment* or *Macbeth*? Moreover, colleges should draw on persons outside the teaching profession: Lawyers, social workers, judges, parole officers, and psychiatrists could enormously enrich instruction.

At some point, mechanisms have to be found to focus all this specialized experience and make it meaningful for undergraduate instruction. The program designers should not view courses as tidbits of knowledge, like beads on a string. The superficial treatment of complicated subjects was one of the weaknesses of interdisciplinary courses that contributed to their undoing. In the matter of crime, for example, the goal should be to relate the knowledge of persons who have studied the theory of crime to the experiences of those who have dealt with crime in our society. Such courses should put students into contact not only with those convicted of antisocial acts but with the environment from which they spring.

Though there is widespread interest in interdisciplinary courses, regrettably few models are in actual operation. Kenyon College comes as close as any to providing an integrated program. Theirs is organized around two major themes—freedom and responsibility. Aside from the programs described in this issue, worthwhile efforts are functioning at Warner Pacific College, North Central College, St. Joseph's College, Stanford University, and the University of Kentucky.

At Kenyon, the Integrated Program in Humane Studies is selected by students with good academic records. The program consists of extensive reading assignments in the classics, with each student expected to read, analyze, and reflect on the works in writing. The seven faculty members in the program meet each Monday evening to plan the following week's work. In addition to general lectures, students participate in weekly small group seminars and individual tutorials. For each seminar or tutorial meeting, they are expected to prepare a position paper, expressing their personal views on the work under study. The program runs for three years, with three credits for the first year, two for the second, and one in the senior year.

The Culture of Western Man is a course required of all freshmen and sophomores at Warner Pacific College. Its intent is to break down the barriers between the disciplines and to introduce students to the central questions of life through readings in classical literature. Since Warner Pacific is a church-related college, the Christian influence on the human condition is emphasized. The course seeks answers to questions that all human beings ultimately face: Is man free? What is progress? What are the eternal values and what are the relative values? Faculty members from various departments give two weekly lectures, but all faculty attend all lectures. In addition, small groups of students participate in discussion sessions that employ the Socratic method. This course has been especially successful. Questionnaires administered to the students who have completed the course reveal that many consider it very difficult and burdensome, but almost without exception they approve of both content and methodology.

A good interdisciplinary program obviously cannot be designed by representatives of one department, or even one academic division. Moreover, at least in the initial stages, committees on curriculum or academic policy cannot function alone. Ad hoc committees composed of members of widely varying competencies who are committed to instructional reforms can, however, given the time and institutional resources, reconstruct general education programs along these lines. Administrators have a crucial part to play by reducing the customary load of professional responsibilities for those who are willing to undertake these assignments.

This is no one-time activity. Each of the major issues of our day, and new ones as they arise, must be examined in the same interdisciplinary manner, taking into account the abilities and instructional needs of a cross section of students who will not necessarily spend their adult lives in scholarly pursuits. ■

Interdisciplinary Studies: A Matter of Definition

by L. Richard Meeth

In spite of many efforts to define interdisciplinary studies, the answers continue to confuse more often than satisfy. At the risk of adding to the confusion but in the hope of clarifying the debate, we propose here a new set of definitions. They were used specifically in the selection of programs described in this issue, but they are also universal in that they apply to all programs that go beyond a single discipline. Thus, although these descriptions are as arbitrary as others from the past, they have the advantage of having been applied on a broad scale and shared with many educators who have contributed to their refinement.

We might think of courses as occupying various levels on an interdisciplinary pyramid. *Cross disciplinary* is the next level after intradisciplinary, which forms the base of the continuum. Cross disciplinary is viewing or observing one discipline from the perspective of another: Describing the physics of music or the politics of literature are examples. The synoptic fields of philosophy, history, and theology are often viewed in relation to another discipline; for instance, art history is cross disciplinary even though it has come to be a field of study itself. Cross-disciplinary programs are the easiest to develop because they allow faculty to remain in their own disciplines, while adopting only what is applicable from another.

Multidisciplinary goes a level higher. It involves several disciplines focused on one problem or issue—the juxtaposing of disciplines, each of which offers a different perspective on a common question or theme. Most thematic or general education courses are multidisciplinary. For instance, the traditional western civilization courses most often divide class time among the disciplines of art, literature, science, and history. Each discipline contributes its own knowledge or approach to the theme with no attempt to integrate or interrelate ideas. Multidisciplinary courses require the student to do the integrating; and the best structured of these teach students how, recognizing that integration is a skill to be learned, not a natural ability.

But, as Alfred Whitehead said, "Education is not a process of packing articles in a trunk," so *interdisciplinary* courses and programs are developed. The fundamental difference between multidisciplinary and interdisciplinary, in practice at least, is that interdisciplinary programs attempt to integrate the contributions of several disciplines to a problem, issue, or theme from life. This meaning requires further definition of the word "integration." In mathematics, integration refers to a specific procedure for the summation of infinitesimals. In physiology, it means the balance of functions which produce a unified organism, and in the social sciences the term describes a state of organization of a social unit. In interdisciplinary studies integration means bringing interdependent parts of knowledge into harmonious relationship. It involves relating part to part, part to whole, and whole to part.

The highest level of integrated study is *transdisciplinary*, which is not of the disciplines at all. Transdisciplinary means beyond the disciplines. Whereas interdisciplinary programs start with the discipline, transdisciplinary programs start with the issue or problem and, through the processes of problem solving, bring to bear the knowledge of those disciplines that contributes to a solution or resolution.

Transdisciplinary programs are certainly the most difficult to teach. Professors and students must know not only the techniques of problem solving but also where to search among the disciplines for contributions. Thus teachers need to be resource persons, broadly acquainted with many fields or thoroughly grounded in knowledge theory. Consequently, very few institutions attempt transdisciplinary study, even though it is the most common approach to the major issues that confront society. Perhaps long-range planning is not widely practiced in education or in our society because so few are prepared to think in transdisciplinary ways.

These definitions may help readers better understand the articles in this issue. Every attempt was made to find courses or programs of each type, at differing stages of an undergraduate experience, both in general education and in majors. Because few programs fit neatly into any one of the classifications, most presented here combine the elements of all. ■

L. RICHARD MEETH is the program consultant for the Change Magazine National Teaching Program.

A Guided Tour Through the Academic Mind

by Evan Jenkins

Undergraduate courses labeled interdisciplinary or multidisciplinary are often criticized for giving students nibbles of several things and no bites of anything. Or, by focusing narrowly, they may impart sizable chunks of learning but leave no real feeling for the fundamental branches of knowledge: What is it like to be, and to approach a problem as, a natural scientist? A social scientist? A humanist? A related problem involves integration: Where do the chemist, say, and the anthropologist and the philosopher overlap in the kinds of knowledge they seek and how they seek it? Where do they part company?

At West Virginia University, a course has been painstakingly developed that aims for the optimum compromise among all the alternatives inherent in multidisciplinary study. It is called The Nature of Evidence, and the heart of it is very much the study of evidence—how it is gathered, tested, and evaluated by people in different disciplines, and above all how it is used in making decisions.

Subject matter knowledge is important in the course, but in a sense it is a by-product. The emphasis is on understanding the ways in which successful practitioners in each discipline use their training and their minds. Students arrive at this understanding through a process of systematic decision making that enables them to solve a series of hypothetical but realistic problems in the various disciplines. In order to solve the problems, they must bring to bear subject matter knowledge acquired outside of class through readings and audiovisual materials at each stage of their work. Each semester they tackle in sequence projects from at least one field in each of the three major academic divisions. This spring projects involved chemistry from the natural sciences, philosophy from the humanities, and anthropology from the social sciences.

The idea, in short, is not to present masses of facts about any one subject. Rather, it is to make a reasonably thorough examination of one representative kernel of knowledge and use it as a springboard for understanding the goals, methods, achievements, and attitudes of an entire realm of scholarship. Learning the kinetic-molecular theory in the chemistry project, for example, and how to apply it to a practical problem is a means to a much more ambitious end: learning how the natural scientist approaches the world and goes about asking and answering questions.

Since goals and methods differ from one field to another, students learn to understand and presumably respect many approaches. They also learn that an essential attitude pervades all—the willingness to criticize and subject one's findings and conclusions to criticism.

Much of the classroom work employs a teaching method that is essentially home-grown at West Virginia, though it follows in the footsteps of Skinner and programmed instruction. The method is called Guided Design. It involves a step-by-step assault on problems that are open ended, meaning they have no absolutely right or wrong answer.

At each step, students are asked to address specific questions arising from the overall problem their project presents. Then a printed "feedback" is distributed that contains answers a professional might give. They are not necessarily the best possible answers, and students are not required to agree with them; instructors in the course say students have improved on the feedback answers at times, necessitating a change in the printed material. Each feedback also contains an instruction for the next step of the project.

Side-by-side with work on specific projects, students are exposed throughout the semester to the concepts and principles that make it clear why professionals in a given field gather and use evidence the way they do. Most of the concepts and principles come from logic and the philosophy of science, which students read about on their own time. Quizzes on the material are given in class; to assure mastery, they can be retaken, and individualized help is given by undergraduate teaching assistants.

As it happens, the head of the Nature of Evidence program is a philosopher, associate professor Gene D'Amour, whose specialty is the philosophy of science and mathematical logic. His chief collaborator (among many) and coauthor of the course's text is Charles E. Wales, a chemical engineer who is a professor of engineering and education and director of freshman engineering. The two are also codirectors of the Instructional Fellows Program, a major component of the university's faculty development efforts. In the program faculty from many departments teach sections of The Nature of Evidence as part of their experience with alternative methods of instruction.

D'Amour and Wales share a couple of attitudes vital to their work together: a belief in the value of general education for all students, which is what multidisciplinary education is all about, and dissatisfaction with the way undergraduates are often taught. Their work on developing what turned out to be The Nature of Evidence began in September 1971, after the university senate, reflecting its own dissatisfaction with existing general education and multidisciplinary offerings, issued a mandate for something that would show the theoretical and methodological relationships of two or more disciplines, or deal with the multidisciplinary analysis of significant

EVAN JENKINS is an assistant news editor of the New York Times.

issues, problems, or themes.

D'Amour, then a recently arrived assistant professor, organized a committee of faculty members from 11 disciplines: biology, chemistry, physics, and geology; anthropology, psychology, and political science; and English, philosophy, history, and theater. Planning, organizing, and preparing materials for the course took two years. Along the way, the question arose of how the course should be taught.

Lecture or lecture-discussion was ruled out, according to D'Amour and Wales, on two grounds: that students might not learn to base beliefs on evidence (as distinct from dicta), and that students would not be actively involved in the gathering of evidence. The decision was to let the students work through problems themselves and to have the professionals serve as guides. The teaching method adopted, not surprisingly, was Guided Design. "We wanted to teach decision making," Wales said. "Most teachers do it on their feet. The point of Guided Design is that it's written out, and you get rid of the variables."

Seven years in gestation, the method had been introduced at West Virginia in 1969 by Wales and a colleague, Robert A. Stager, then on sabbatical from the University of Windsor, Ontario. It had been used first in freshman engineering, then in other courses. The early results—later reinforced—had been heartening, and the marriage of Guided Design with The Nature of Evidence seemed a perfect match.

Working with D'Amour and Wales, the interdisciplinary committee developed 12 Guided Design projects for the course. ("I got my liberal arts education working with the other faculty members and Gene," Wales said, "and I got a pretty good one.")

The projects all involve fictional but plausible problems in Rwamkoma, a village established by the Tanzanian government in the 1960s as part of a national effort to modernize agriculture and improve the lot of the widely dispersed rural population. The planners of The Nature of Evidence wanted the course to happen, as it were, in one locale (the premise is that the students are in Tanzania under an exchange program). There would then be continuity and an underlying core of real data about the place and its people.

Rwamkoma was chosen for several reasons. A member of the interdisciplinary committee had spent a year in the village studying its political problems, and the university had an agricultural station there. As a new community, it offered intriguing cultural, social, and political problems. And as a remote community, it was pristine for students and teachers; there would be no interference from prior knowledge or biases as there might be, say, in Morgantown, West Virginia.

Charles Wales (left) and Gene D'Amour by the rapid transit system that connects the three WVU campuses.

In the chemistry project this spring, the kinetic-molecular theory—and through it, the natural scientist's approach to evidence and decision making—was explored in "The Case of the Mysterious Drink-Happy Bird." Students were asked how to handle a situation in which a witch doctor tells villagers he has conquered the laws of nature and discovered an inexhaustible supply of energy with a mechanical toy bird that bobs up and down continually as long as its beak can reach water. Under the overall guidance of a faculty member from the Instructional Fellows Program and with help from two or three undergraduate teaching assistants per section (teaching assistants receive three credits for the semester), students worked in groups of four to six.

Proceeding in what Wales calls "slow-motion decision making," they encountered and put to use such natural science concepts as the need to (1) gather evidence through precise observation; (2) generate hypotheses; (3) perform experiments (and repeat them, and devise new ones); and (4) synthesize a scientific explanation. They were also exposed to such subject matter information as the relationship of molecule size or weight to boiling point and a simple test for the presence of halogens. Besides the class project, students did "parallel projects" on their own. These involved experiments using the kinetic-molecular theory to explain why a plastic bottle caves in after it is filled a third of the way with boiling water, capped, and then placed in cool water or ice.

D'Amour and Wales are strong believers in the efficacy and lifetime practicality of group decision making and its importance in undergraduate education. "I decided as an undergraduate that the worst system was the educational system," Wales said one day this spring in his office on the sprawling Morgantown campus. His graduate work therefore included heavy doses of psychology and education courses, and his dissatisfac-

Students explore "The Case of the Mysterious Drink-Happy Bird."

tion led ultimately to the Guided Design teaching method.

D'Amour, echoing a complaint voiced by teachers and students everywhere, remarked: "A lot of teachers seem to feel that they're dropping diamonds, and the students have to pick them up, and if they don't it's their own fault. If you can teach teachers to look at an instructional system as something they're responsible for, you've done a job."

The Nature of Evidence encourages maximum discussion and stresses the student's right to disagree with the instructor or the printed matter. "But if you're not very careful, it doesn't happen that way," D'Amour said. "They end up trying to guess what the feedback will be. So whatever they arrive at, we congratulate them, as long as they're reasoning. In fact, we've had to rewrite some of the projects because the students came up with better answers."

In the social science and humanities parts of the course, the conclusions are less cut-and-dried than in the natural sciences. D'Amour concedes that the philosophy project, which relies heavily on reasoning that is so orderly as to be mathematical, is not completely representative of the humanities. The project calls for students to develop a "criterion of demarcation" between science and pseudoscience so they can advise the Rwamkoma council on the hiring of consultants. At the same time, the project seems essential to the course, since it raises a question basic to all disciplines: Whom should one believe, and why?

This spring, D'Amour saw a need to reschedule so that the course would include a more typically humanistic project. The English project, for example, stresses conclusions based on norms and values, rather than on deductive logic, in asking students to decide whether a poem supposedly written by a Rwamkoma student is original and has literary merit—whether it was worth doing by the discipline's standards.

If evidence is the heart of The Nature of Evidence, then decision making is what makes the heart beat. Appropriately enough, the first project of the semester is not from any one discipline but is central to all. It is called "The Fishing Trip: An Introduction to the Process of Decision Making." By attempting to figure out what four friends should do when they find themselves stranded on an uninhabited island with a disabled boat and scant supplies, students discover that there are 11 steps in decision making that can be applied, with some adjustment, to most academic or real-life situations. As set forth in the series of instruction/feedback sheets distributed at each phase of the fishing trip project (and summarized at the end), the steps in decision making go in this order:

(1) Identify the problem. (2) State the basic objective or goal. (3) State the constraints, assumptions, and facts. (4) Generate possible solutions. (5) Evaluate and make a decision (choosing from among the possible solutions). (6) Analyze the elements of the chosen solution. (7) Synthesize (combine the elements into a detailed solution). (8) Evaluate the solution. (9) Report the results and make recommendations. (10) Implement the decision. (11) Check the results. (Although appropriate for most situations, numbers 9 and 11 seem somehow out of place in such a do-or-die predicament as isolation in the middle of nowhere.)

Gathering information—evidence—precedes the whole process and may be necessary at each step. Thus the first part of the fishing trip project involves making a list of what the four friends on the island have with them in their time of crisis. Then, in Instruction A, the students (having divided into small groups) are asked to assume they are the stranded fishing party and to discuss what they would do about the problem.

Once they do that, they get Feedback A, which tells them that the friends have talked about rowing to shore, rationing food and water, and so on. But the same printed sheet contains Instruction B, in which one of the friends points out that they have discussed the possible solutions without figuring out what problem the solutions are supposed to solve.

As the project goes along, it becomes clear in successive instructions and feedbacks that the problem is not the fact that the friends are stuck on the island, or that the propeller on the boat's motor is broken, or that the nearest populated place is 60 miles away (too far to row), or that there is no water on the island and only a little soda and some ice on the boat, or that the sun is hot as blazes. Those are facts and constraints.

Since a key assumption is that attempts will be made promptly to rescue them, the four conclude (in Feedback B-Instruction C) that the problem is survival until the rescuers arrive. But that is too broad. Analyzing further, they decide (in Feedback C) that the problem is really the threat of dehydration and that

in stating the problem they have also identified the basic objective—to avoid dehydration. They proceed accordingly and are saved, a happy denouement that takes several more pages of instructions, feedbacks, and information sections.

Because The Nature of Evidence relies on such structured material, it does not depend for its success on the presence of its creators. Sections of the course at West Virginia have been taught by faculty members from the departments of pharmacy, nursing, and library science, among others, and the course has been adopted at other colleges.

Guided Design is being used successfully in a number of other courses at West Virginia and elsewhere. It is one of the teaching techniques chosen by the Exxon Education Foundation for dissemination through its IMPACT program (Implementation of Materials and Procedures Affecting College Teaching). Part of the dissemination involves a film on The Nature of Evidence.

But for all the structure, D'Amour and Wales like to point out that because the course involves constant interchange between students and instructors, it can easily be refined and improved, and often has been. A key problem after the course was introduced in 1973 was rigidity. For example, students in 1974 were asked to rate from 1 (not descriptive) to 5 (very descriptive) the following statement: "In the Guided Design projects, students feel they are too heavily directed toward one solution and that their own views and solutions aren't taken into account." The mean response was a disappointing 4.24. But by 1977, with much more emphasis placed on the "possible" correctness of the feedback answers, the figure from a similar survey was 2.76.

The course was first taught to two sections of 25 students each. Enrollment now is about 400 a year, and D'Amour says there are twice as many applicants as places available. Interviews with students this spring suggested that one reason for the popularity is that the course can be used to fulfill credit requirements in any of the three core divisions.

The interviews produced solidly favorable comments on the course, along with several complaints about the workload. "It teaches you a decision-making process you can use all your life," said Peggy Glass, a first-semester senior majoring in housing design who took the course in 1977 and will be a teaching assistant in it next fall. "Some people took it because they thought it was easy, and in a way it is. Each thing leads to another, and you can't help but learn. You get an A or a B if you make the effort. But you don't do well if you goof off."

Martha Howard, associate dean for instruction in the College of Arts and Sciences, said familiarity with the course had "turned around" two courses in English and linguistics that she teaches, and she declared: "It's been a tremendously successful course. The students like it, and so do the faculty members who know what it's all about. Some say it's popular because it's easy, but if you look at that course, those kids work. There's also a feeling among a few of the faculty—not the administration—that it's pandering to the mob. There are a lot of traditionalists who don't realize that different teaching methods are available that are applicable to their own disciplines. But the critics who take the trouble to find out about the course, or maybe teach a section—they've become converts."

Despite some concern that interdisciplinary courses tend to be neglected in department-oriented university establishments, Wales and D'Amour have enjoyed considerable recognition and support on the campus and from outside. D'Amour is a nominee for one of the University Outstanding Teacher awards given annually to three of the university's 1,500 faculty members (Wales won one several years ago for his freshman engineering course). The Instructional Fellows Program they head got started with a $100,000 grant from the Lilly Endowment, and the university's colleges now support it to the tune of $50,000 a year, mostly for salaries during a six-week summer workshop. (During the school year, the participants are released from some teaching duties in their departments.)

Quite independently, a student in The Nature of Evidence and an administrator who has watched and applauded its progress expressed parallel views of its ultimate value. "It tends to teach people habits of mind that are very valuable later in life," said Jay Barton, vice president of the university and provost for academic affairs. "When we ask our graduating seniors to evaluate their experience, a lot complain about the general education requirements. But this course comes out very well; it's obvious that it's helped the university show why general education is valuable. I'm a scientist, and my own thinking about multidisciplinary study is that it shouldn't ask the students to memorize all the muscles in the frog, but it should show them why some people have studied the frog and the nature of the questions they asked. This course does that."

Michael Neal, a sophomore who expects to major in political science, gave the course a generally favorable review one day after a class devoted to the anthropologist's problem of improving the diet in Rwamkoma in the face of food taboos. He found The Nature of Evidence redundant at times, he said, and the paperwork piled up. "I don't know how much I'll remember in five years," he said. "I doubt I'll remember much of the terminology, for instance. But the decision-making process—I'm sure I'll remember that." ■

Learning experience:
The Nature of Evidence: a Guided Design-PSI, general education experience dealing with the similarities and differences between the decision-making and evidence-gathering methods of the natural sciences, social sciences, and humanities. No prerequisites. Enrollment: 400 at WVU, 800 at other universities.

Other descriptions:
"New Directions in Liberal Education for the Engineer," *Engineering Education* (Effective Teaching Issue), February 1977.
"Integrating Physics and the Philosophy of Science," *American Journal of Physics*, September 1976.
"Teaching Philosophy by the Guided Design Method," *Metaphilosophy*, January 1977.
Guided Design Part I, a free booklet obtainable from Charles Wales, Freshman Engineering, West Virginia University, Morgantown, WV 26506.
Guided Design film, a 25-minute, 16mm film featuring The Nature of Evidence, is available free from: Film Scheduling Center, Modern Talking Pictures, Inc., 2323 New Hyde Park Road, New Hyde Park, NY 11040, (516) 488-3810.

Similar programs:
Other schools that have used The Nature of Evidence course materials are: University of Wisconsin, Whitewater; Alverno College, Milwaukee, Wisconsin; University of Tennessee, Knoxville; Bennett College, Greensboro, North Carolina; Franklin-Pierce Law Center, Concord, New Hampshire; Mater Dei College, Ogdensburg, New York; Nihon University, Matsudo, Japan.

Contact:
Gene D'Amour, Codirector, WVU Instructional Fellows Program, Department of Philosophy, West Virginia University, Morgantown, West Virginia 26506, (304) 293-3641.

The Greening of an Engineer:
Humanism and the Erie Canal

by Liva Baker

In October 1970, on the day before Worcester Polytechnic Institute, a small private college of engineering, announced its new plan to force-feed undergraduates large doses of the humanities, WPI president George W. Hazzard told a reporter for the *Wall Street Journal*: "Four years from now may well see Worcester Polytechnic Institute as a true innovator in private higher education. On the other hand, you might see me standing down here on Route 9 with my thumb out."

I looked for the tall, slim, bespectacled president as I drove into Worcester, Massachusetts, but found him still comfortably installed in his campus office. It was the eve of his retirement as president, but his reputation for implementing academic innovation at WPI had preceded him, and he was already easing into the new task of administering some Association of American Colleges, Ford Foundation-funded grants for innovative academic projects. He was genuinely pleased, in his soft-spoken way, about what had been accomplished at his institution over the past decade. "You always have an ideal. Clearly, we're not up to the ideal. But I think in a practical way we've come an awful lot further than any of us thought we really might," he says.

What has been accomplished is a complete restructuring of the curriculum for the purpose of interweaving those two historically incompatible areas of study: science and the humanities. In the process, methods of student learning and of faculty teaching have been turned upside down. All this has had an impact on the rigid, traditional college approximate to the earthquake's on San Francisco.

The Plan, as it is known, is based on the concept that if society is to survive, science and society cannot remain separate concerns, although traditionally they have been so. In the past the bridge builders have considered historians unnecessary, dull, certainly impractical, the academic lightweights. The purveyors of poetry have viewed the practitioners of the mechanical arts as unimaginative, lacking in sensitivity, not a little inferior. Those universities that established schools of science and technology at all made it clear through narrower admissions requirements that scientific students were not up to liberal arts standards. Yale, in the early days of scientific education in America, went so far as to segregate science and liberal arts students in chapel.

However, scientific developments of the twentieth century pointed up the urgent need for humanistic contributions to the education of technologists. The fears Henry Adams voiced in 1862—"Before many centuries more, science will be the master of man. The engines he will have invented will be beyond his strength to control"—had been realized in Albert Speer.

"I go further than that," declares Hazzard. He is concerned not only about the absence of the human factor in environmental management and of ethical concerns in biomedical engineering; he is concerned, too, about the inadequacy of the poet's scientific background: "I say that most liberal arts colleges are producing technically illiterate people who therefore lack what I consider basic information for citizen decision making, and it turns out to be very, very difficult to provide that technical literacy to liberal arts people."

Hazzard came to WPI in July 1969, at about the time the Plan was beginning to take definite shape in the faculty committee charged with restructuring the institution. A physicist by profession, he came because he liked the direction the Plan was taking—it "coincided with what I have always felt about science education, that it's a critical component of liberal education." One of his first executive orders allocated money for continuing the work of the committee, and he has since snatched every available opportunity to advertise the Plan's merits.

WPI is neither the first nor the only institution to have recognized the need for humanistically literate technologists. Other institutions are revving up their humanities and social science programs. The curriculum at West Point, generally acknowledged as the nation's first engineering school (excluding the challenge of the Erie Canal), has traditionally been heavily weighted with mathematics, science, and engineering courses; this fall the military institution inaugurates a new curriculum in which for the first time humanities and public affairs offerings will be slightly more numerous. Massachusetts Institute of Technology has a new Program of Science, Technology, and Society, intended as the experimental phase of a prospective college of the same name. Other institutions have added individual interdisciplinary programs and some even call upon the talents of outsiders. Norman Cousins, former editor of the *Saturday Review*, has joined the faculty of UCLA to teach lit-

LIVA BAKER is the author of I'm Radcliffe, Fly Me: The Seven Sisters and the Failure of Women's Education [Macmillan].

erature and philosophy to medical students, and he recently participated in a task force on medical ethics at the College of Physicians and Surgeons at Columbia University.

WPI, however, has attacked the problem with a rare intensity. Not content with distribution requirements and/or interdisciplinary courses, WPI works to make the student and future technologist him- or herself (women constitute about 10 percent of the undergraduates) interdisciplinary; to make social, economic, and other human factors as basic to each student's technology as calculus, so that the knee-jerk reaction to problems of design inevitably includes the societal factor.

How does WPI move its students, traditionally not very confident in their ability to wander in alien territory and very vocationally oriented, toward this goal? First, there is what WPIers call the sufficiency requirement, which constitutes one fourth of the requirements for the BS degree. It consists of five thematically related courses followed by an independent project or study. Students in effect minor in a branch of the humanities or social sciences, which means not a casual sampling of a little literature here, a little philosophy there, but rather a thorough study either within a single discipline or across several disciplines within a single time period. In the old days, explains William R. Grogan, dean of undergraduate studies, freshmen took English, sophomores took history, and a couple of similar electives were available to seniors; "but there was always the 'introduction to,' " beyond which students rarely had a chance to progress.

Then there is the Interactive Qualifying Project, or IQP as it is known on campus, one of those academic titles whose vagueness is inherent in its origins. The creators of IQP began with the idea that "engineers have traditionally been narrow...unaware of the consequences of their craft," says James Demetry, professor of systems engineering and chairman of the Division of Interdisciplinary Affairs, which administers that aspect of the WPI Plan. From that they decided that "the student shall do a project in which a problem is attacked which relates technology to society. And that's about as prescriptive as it was because no one really knew what form the thing would take."

Like the sufficiency requirement, IQP constitutes one fourth of the WPI degree requirements; it may be completed in one seven-week term (the WPI academic year is divided into four seven-week terms plus a summer term) or it may be spread over several terms. On the theory that engineers are problem solvers, projects are an essential part of the WPI Plan. An IQP may be undertaken by a single student or by a team of students, usually under close supervision by faculty from science or technology *and* humanities or social science. Its purpose remains to relate technology and science to social or human needs, and no one is ever certain exactly what direction a student will choose. The sky is the limit, and there is, of course, the inevitable campus cartoon showing the adviser shaking his finger at a student: "No, I don't consider an in-depth study of Farrah Fawcett-Majors's impact on the male public a subject for an IQP!"

Students have in fact devised a number of outlandish schemes, and some faculty members believe that quality control is a major problem of IQP. Other projects have proven viable and socially beneficial. Some projects are student initiated, others are faculty initiated. Every spring classes are suspended for a Planning Day, during which faculty and outgoing seniors set up booths in the auditorium to display their project wares, and undergraduates spend the day shopping.

During the evolution of the IQP over the past several years, a dozen or so general areas of student/faculty interest have emerged, among them Legal Systems, Law Enforcement, and Criminal Justice; Transportation Policies and Alternatives; Hazards Analysis; Education in a Technical Society; Unemployment, Poverty, Inflation, and Technological Development; and Urban, Regional, and State Development. Within the general areas, students devise appropriate interdisciplinary projects. For example, under Legal Systems, Law Enforcement, and Criminal Justice, which may appear only remotely related to science, a mathematics major tutored prisoners in math at the Worcester County jail; another student investigated the legal background and technical hardware as well as the social and political issues involved in surveillance.

Some projects are independently created. Two electrical engineering majors, for example, recently analyzed the sewerage problems of the nearby town of Holden and made recommendations to the town government for sewer planning

John A. Perry

A pedestrian mall at WPI; President George W. Hazzard; and a student lounge with a closed-circuit campus television monitor.

John F. Wellsman

in the light of potential population growth. Other projects are conducted in continuing project centers that WPI has developed over the years. Another electrical engineering student went down to St. Vincent's hospital in Worcester and asked for a problem to solve. He's developing methods for training nurses to use complex medical devices, "explaining the concepts behind the function," as he says, and he has in fact videotaped a minicourse for the hospital library.

WPI also sends about 50 students each fall to Washington, D.C., where under the tutelage of faculty from science, humanities, and social sciences, they fan out into various private associations, government offices, and agencies. WPI students, Grogan explains, have a substantially different orientation from many students who have developed into a kind of sub-bureaucracy of interns in the nation's capital. The latter "fit into the scene" when they move into a Senator's office or HEW, whereas WPI students "are given a specific problem to solve, which they start here way back in the spring. The Washington residential tour—seven weeks—is spent getting data to solve that problem. So they go with a highly specific and definite goal." Some recent Washington IQPs: At the National Institute of Education an electrical engineering major and a management major studied the effect of mandatory relicensing of engineers on the demand for and availability of continuing engineering education; in the Department of Commerce, a chemical engineering major prepared a first-level feasibility study of electric power system options for New England in 1986-1990.

If the sufficiency requirement and the IQP are not enough to turn an engineering student into a humanist, WPI also offers a number of interdisciplinary courses. Some, like Humanity and Environment, are more common fare. One uncommon course is designed to introduce freshmen to an integrative approach in the sciences and humanities. Light and Vision examines the scientific, psychological, and artistic responses to light, an everyday phenomenon that has mystified people since the earliest myths of creation. The course is presented scientifically and metaphorically, with students reading Newton's *Opticks* and selections from Plato's *Republic*, R.L. Gregory's *Eye and Brain* and selections from Milton's *Paradise Lost*.

Finally, students always have the option and are even encouraged to put together an interdisciplinary major. The classic example that WPI people refer to is one devised by a student some years ago in Fire Protection Engineering. "At the time I didn't know what it was, frankly," Grogan admits, but the student "knew exactly what he wanted to do...chemistry, economics, statistics, structures, hydraulics. And so we put together a very good program."

Like so many other innovations in education, the WPI Plan is a product of the academic and social ferment of the late 1960s, and a more improbable campus for revolution is difficult to imagine. Founded in 1865, the school was old. Established to provide trained manpower for Worcester, a typical New England factory town producing goods from carpets to corset wires, the institution had a long and successful history of preparing young men for industry. Having little reason to change, it was basically conservative. For many years, a succession of retired military officers ran the college like a military base, and faculty had little voice in decision making. Many of the

students were first-generation college goers who saw their education as strictly vocational. The curriculum was as rigid as the attitudes.

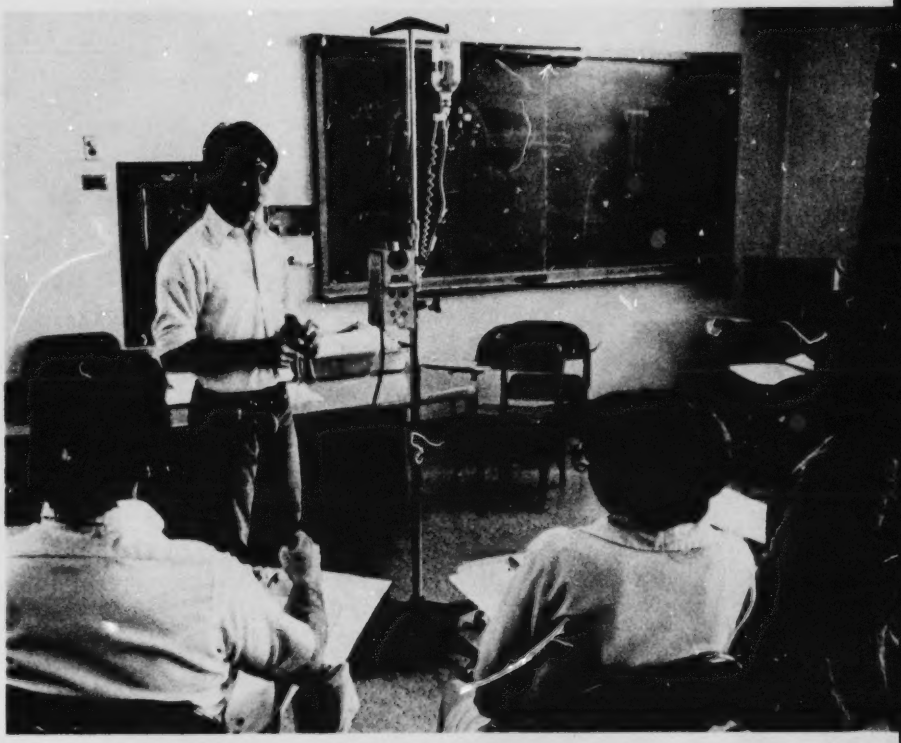
Nevertheless, even here rumblings were heard during the 1960s. Students began to complain about the formalism and lack of realism in the curriculum—a program of science, math, and engineering so regimented that report cards were printed with the course offerings in advance, leaving only one or two blanks for the senior elective(s).

Hazzard's predecessor, General Harry P. Storke (ret), and some members of the faculty began to experience what Grogan calls "a gnawing dissatisfaction.... Maybe the rigidity of the program, which was typical of science and engineering programs at the time, was not really bringing out the best in students." Many colleges learned that act of academic life to their peril when engineering student enrollments dropped 33 percent nationally between 1970 and 1973. With the intention of adding only a few electives and making no real substantive changes, members of the WPI faculty and administration undertook in 1968 a thorough assessment of the curriculum, the methods, the institutional purposes and goals, and decided, "There must be another way of doing it."

The president's planning group compiled a list of more than a dozen alternative futures for WPI. These ranged from joining the state university system to becoming a college for entrepreneurs and inventors. What finally evolved as the WPI Plan drew from most of the alternative futures that had been presented. It was adopted by the faculty on June 30, 1970, by a vote of 92 to 46.

There are other components of the Plan besides the interdisciplinary. The formal course structure has radically changed. Courses are still offered at WPI, but the preferred mode of learning is through project work. In addition to the IQP, a Major Qualifying Project (MQP) in the student's chosen field of concentration constitutes another fourth of the degree requirements, and faculty are gradually introducing project work to the remaining formal courses. The point is for the student to confront real-world problems, and instruction at WPI today combines scholarship with the experiential learning of the Erie Canal.

As part of its revolution, WPI swept away all specific course requirements and put the student in charge of his or her academic career. Even prerequisites may be abandoned if a student can demonstrate familiarity with appropriate



Electrical engineering major Francis Maldari explains intravenous equipment to nursing students.

A student works on a television camera modified for aural use by the blind.

William R. Grogan, dean of undergraduate studies.

background material. Conventional grades have been replaced with "Acceptable with Distinction" and "Acceptable"; unacceptable work is simply not recorded.

Though this may sound as if WPI has turned individual freedom into campus-wide anarchy, there are two rigid controls. First, faculty advising is intensive and tight. A student may accumulate a number of advisers during one academic career: an overall adviser, two for the IQP, one for the MQP, and one for the sufficiency requirement. While the quality of advising varies from instructor to instructor—this is one component of the plan that is not up to the ideal—at least one, and sometimes more than one, adviser proves effective and influential.

The second control is the student's required demonstration of competency in his or her chosen field. Rigorous written and oral competency examinations—usually involving complex problems that a graduate might encounter in a job situation—test a student's command of methods as well as comprehension of information and principles. The competency examinations constitute the final fourth of the degree requirements. Along with the qualifying projects, they are what Grogan calls the "accountability at the terminal end," which allows WPI to keep the course structure flexible without downright looseness. Three years of satisfactory work as an academic base are required before the examinations can be taken.

The Plan was not put into operation overnight. It was phased in beginning in 1971; by 1974, 70 percent of the undergraduates were enrolled; today participation is 100 percent. Grants from the Alfred P. Sloan Foundation provided funds for a consciousness-raising program for faculty: For two summer sessions faculty members heard speakers and participated in seminars on the relationship between science and technology; they also surveyed actual problems off campus, in areas where society and technology interacted—the Worcester Wetlands, for one example, birth control methodology for another. Many of the problems they observed emerged later as student projects.

While the Plan may not have achieved 100 percent success instantly, it is now firmly entrenched. Edmund T. Cranch, dean of Cornell University's highly traditional, research-oriented School of Engineering, who assumes the WPI presidency on July 31, is already talking about the Plan's "untapped possibilities" and the "next phase of refinement." It has attracted alumni support—once they were educated on its merits—and a good deal of foundation support. Student enrollment, which was slipping nationally at the time of the Plan's implementation, has risen from 1,500 to 2,400; and admissions office people claim today's applicants have "a sense of adventure," and are "much more interesting" than pre-Plan applicants. And a detailed six-year (1972-78) evaluation, "The Impact of the WPI Plan on its Students and Graduates," has pronounced it basically sound: Students have assumed responsibility for their own learning, they appear to be turning into "that engineer of the future potentially capable of dealing effectively with the societal-technological interface," and supervisors of graduates in industry have given the Plan good marks overall.

However, serious problems remain, and the one that emerges, whether one talks to students, faculty, or the administration, is the inadequacy of the advising system. The number of faculty has not risen proportionately with the number of students. In addition, participation in the Plan is required for students but voluntary for teachers, and a number of faculty remain devoted to their own research. All of which means, in the words of a memorandum to an administration-commissioned evaluation of IQP: "It is obvious...that a number of persons have made virtually no contribution to what is basically a faculty-wide responsibility, while others have been overextended to the detriment of project quality control." This arrangement, plus the unconventionality of the programs, has made it difficult to distribute the usual faculty rewards and recognition—tenure and promotion.

Can the WPI Plan be exported? Probably not in its entirety, s[illegible] Ray Bolz, vice president and dean o[illegible] faculty. "The parts and pieces of the Plan," he says, "can be used elsewhere [the humanities sufficiency is easily transferable, as are also, for example, competency-based education and projects], but I doubt the whole thing could be transported as a total, unified program."

For an institution to adopt anything like the WPI Plan, says Hazzard, it must above all be self-confident; in addition, it ought to be small and have a core of what he calls "the middle-aged Turks"—faculty who want change but already have tenure. "That does not mean," he adds, "that you have to think always of exporting engineering as a liberal education program. You can export the concept of how you change yourself.... There are lots of ways to educate people. What you really want to export is the willingness to develop diversity." ■

Learning experience:
Technology and Society: Requires each student to complete an interdisciplinary qualifying project before graduation intended to relate science and technology to social concerns or human values. Enrollment: 580 annually in approximately 360 projects, many with off-campus sponsors.

Other descriptions:
Roark, Anne C. "A New Curriculum is Engineered for Technological Humanists," *Chronicle of Higher Education*, January 10, 1977.
de Rhoda, Andreas. "The Making of a Technological Humanist," *American Education*, January-February 1976.
"It's Your Education," *Mosaic Magazine* of the National Science Foundation, 4 (3) Summer 1973.
Monroe, Sylvester. "WPI's Program for Technological Humanists," *Change*, 6 (5) June 1974.
Grogan, W.R.; Scott, K.E.; Demetry, J.S.; Peura, R.A. "A New Approach to Education—The WPI Plan." Available through WPI upon request.
"Interactions—A Comprehensive Summary of Interdisciplinary Project Developments at WPI." Available through WPI upon request.

Contact:
W.R. Grogan, Dean of Undergraduate Studies, Worcester Polytechnic Institute, Worcester, Massachusetts 01609, (617) 753-1411.

Exploring the Shape of American Culture

by Stan Luxenberg

Not everyone in Philadelphia was enthusiastic about the results of a Bicentennial research project conducted by students of Temple University's American Studies program. In fact, some members of the Center City Residents Association were furious.

Having learned about Temple's efforts to chronicle the history of communities, the civic association had asked Philip Yannella, associate professor with the American Studies program, to profile the Rittenhouse neighborhood, a square-mile area in the center of Philadelphia where 25,000 people now live. And as the city's Bicentennial hoopla proceeded, Yannella and nine students tackled the class project, examining tax records from the 1840s and doing a detailed architectural survey to identify which of the area's many colonial-style buildings dated back to the first half of the nineteenth century.

The description of the neighborhood that emerged was very different from what the residents' group had anticipated. Yannella recalled that the association, seeking good publicity and possible help in winning federal grants, had expected the students to paint a picture of elegant ladies and gentlemen riding carriages through well-kept streets. What the students found was that in the early period only 1 percent of the area's residents were professionals and 80 percent were unskilled, many of them poor immigrants. The spot that was to become elegant Rittenhouse Square served as a dump. "They wanted to be told that George Washington slept here," Yannella said. "We emphasized the working-class roots of the area."

The students also assisted a filmmaker who produced a documentary on how the area is evolving today. The film discussed the rising real estate costs that are driving out long-time poor and minority residents. The results of the research, presented by the students to a crowd of 300 from the community, were met with objections, and some members of the residents' organization tried unsuccessfully to prevent further showings of the film.

Most of Temple's American Studies courses have proved to be less controversial than the center-city study, but wherever possible the program has encouraged students to be innovative and strive for a broader view. "It's been very enterprising all along," explained George Johnson, dean of the College of Liberal Arts. "Their walls have not been poured in concrete."

Temple established its American Studies program in 1972 in response to student and faculty interest. From the beginning the program has sought to be truly interdisciplinary. Many schools have created American studies majors by simply putting together lists of history or literature classes. But Temple has struggled to develop classes that use the techniques of many disciplines to address wider questions. "Traditional departments don't allow for changes in the structure of knowledge," says Miles Orvell, director of the program. "In many cases it's simply anachronistic to think along the lines of the traditional disciplines."

In the fall semester 1977, for example, Orvell taught a course entitled Images of the City that traced how the city was viewed by a variety of observers, including nineteenth-century social reformers, immigrants, photographers, and contemporary writers such as Jane Jacobs and Lewis Mumford. The course could not easily be categorized as sociology, history, or urban planning, though it included elements familiar to all those disciplines. "We examined how images of the city reflected and influenced the city—not just what happened," Orvell explains.

The professors have attempted to deal with American culture in its broadest sense, to explore how a wide range of factors have interacted to shape it. Yannella recently taught a course called American Culture Since World War II. Students read *On the Road* by Jack Kerouac, Allen Ginsberg's *Howl*, Thoreau, and works on suburbanization and the intellectual atmosphere created by fears of atomic weapons. "By the end of the course students were seeing why a book like *On the Road* gets written and why it would come to have mass appeal," Yannella says. "They begin to make connections about how social developments happen."

Temple is a state university with 40,000 students, many of them commuting to the campus located in a poor section of north Philadelphia. For a few, American Studies offers a haven within the large and sometimes impersonal institution. Since there are 35 majors in the program and between 150 and 250 students taking courses each semester, students get to know each other and their professors better than they would in other departments. "It's a very small program, so you can feel like you're part

STAN LUXENBERG is a free-lance writer based in New York City. He has written for the Washington Post and the New York Times.

Steve Harlan

Miles Orvell, Robert Levin, Debbie Forstenzer, and Phillip Yannella direct the American Studies program at Temple.

of something," says Sandra Buchsbaum, a senior major.

American Studies at Temple is technically a program, not a department (a department is defined as having three full-time professors). Robert Levin, a historian, is the only professor assigned exclusively to the program. As the director, Orvell spends most of his time working in American Studies but holds a joint appointment in English and American Studies as does Yannella. Each semester the program borrows about six instructors from other departments.

In the first years of the program there was considerable experimentation as professors who had never used the interdisciplinary approach taught unfamiliar classes and achieved what they felt were mixed results. Now, though the program is more firmly established, the professors have continued to carefully evaluate their efforts and revise courses. Indeed, while students' detailed course critiques have shown little but praise, the professors have often been self-critical, openly expressing doubts in their reports. For example, some professors believed that the early courses were often not focused enough, placing unrealistic burdens on students to synthesize disparate material. Others worried that students needed more guidance in selecting courses. "The program three years ago was a vestige of the late 1960s," Yannella remarks.

In the 1960s, Temple—like universities across the country—dropped many of its course requirements. American Studies followed suit. Students in the program were only required to take five core courses and complete a senior essay. The subjects of the courses varied from year to year, and different professors taught them. In 1973-74, its first full year, the program offered a sophomore introductory course, Studies in American Culture, a junior course, Problems in American Culture, and a junior seminar that traced the quest for freedom of thought and expression in American life. The following year the sophomore introductory course was again given, while the junior courses covered the imprint of Puritan thought on America and the tension between individualism and collectivism in American life. The senior seminars were opportunities to pull together the earlier courses and work on senior essays.

Gradually the program moved away from this free approach. In the 1975-76 academic year the five required courses were more tightly defined so that a student began with a sophomore course dealing with a broad topic such as War and the American Character or The City and the Country. In the junior year students first took one course on a place or region (e.g., New England) and then one dealing with a period in American history (e.g., the 1930s). The senior courses explored more sophisticated problems such as American attitudes toward Europe or American intellectual currents from 1940 to the late 1960s. Courses still varied from year to year.

By last year the professors began to seek a more definite structure. Students, the professors observed, were receiving American Studies degrees without having taken basic history or literature courses. Some were taking courses that overlapped. Not all students were producing senior essays that made original contributions to scholarship, as the professors had hoped.

Last spring the three American Studies professors—Orvell, Yannella, and Levin—began discussing how to reshape the program. After much debate and criti-

Steve Harlin

Orvell leads a class in a discussion of elite and mass culture. A field study student discusses a case with the executive director of the Philadelphia branch of the ACLU.

cism they devised a list of courses that was approved by the 11-member American Studies Council, the program's governing body made up of the three professors and representatives of other departments. Beginning fall 1978 majors will be required to take the five core courses plus three courses in history and literature and one course in a non-American culture to develop a broader perspective. All majors must do either a field study or write a senior essay.

The revised courses were designed to build one on another so that all majors can progress from simpler to more difficult areas and be exposed to a common and coherent core of knowledge. The first course, called Success in America: Business, Work, and Social Class, examines the nature of work in industrial society and its rewards. It will treat the ethic of work and success, labor activities, and social mobility. Second will be The Impact of Technology on American Life, which deals with the ethos of the machine and its pervasive effects on American life. The third, American Place: Home, City, and Region, will deal with the significance of the place where one lives: housing, neighborhoods, and regions. It will examine how geography affects economic activities and how urban sprawl has shaped local identities.

In the fourth course, Arts in America: From Low to High, students move from economic and material forces that have shaped American culture to the arts the culture has produced. "We want an understanding of the arts to be based on work, technology, and forces such as regionalism," Orvell explains. "We want to examine the artist in society. What has been the role and mission of the artist." What the students will learn about work and social class will be of importance in considering questions about the audiences artists have reached, and technology will be emphasized in discussions of the development of mass culture and the arts. The final class will be Ideal America: Utopian Communities and Thought. The course will examine groups and thinkers who stood outside the mainstream of American culture. Reading utopian literature will provide a way to take a critical look at the material covered in earlier core courses.

Besides experimenting with course content, the Temple staff has tried a variety of off-campus projects. With the help of a three-year $180,000 grant from the National Endowment for the Humanities (NEH) that was awarded in 1973, the program began sending students to work as interns in community institutions and conducted several historical surveys of communities, including the controversial Bicentennial study of the center city. Though the professors have decided that they should now concentrate on overcoming basic weaknesses in the on-campus curriculum, the community involvement has continued since the NEH grant expired.

For many the highlight of the American Studies program is the field study. Students may take up to 16 hours' credit (one semester) working in one of about 40 area institutions. Since much of the NEH grant money was earmarked to pay students $2.50 an hour for field work, most majors took the maximum allowable credit. Now that students are no longer paid, most still take field study, though not the maximum credits, and some who are not majors now participate. Cultural institutions, perpetually short of funds and understaffed, welcome free student help. Debbie Forstenzer, the field study coordinator, meets with representatives of organizations around the city, placing about 10 students each semester with museums, libraries, and groups including the Philadelphia City Planning Commission, the Ukrainian Congress Committee of America, and Valley Forge State Park.

The school is careful to ensure that the students' work will be academically oriented. A student interested in a job meets with a staff member from the institution who will act as a supervisor. If both are satisfied that the project seems to be of mutual interest, they sign a contract that spells out what the job will entail. Patricia Delmar, a senior American Studies major, spent the

Learning experience:
American Studies Program. Enrollment: 200 undergraduates in various courses. American Studies majors: 35.

Other descriptions:
Guide to the Program and other descriptive materials relating to courses and field study available upon request.
"Temple University American Studies Programs," *NEH Division of Education Programs: Selected Project Descriptions, 1977.* Washington, D.C.: National Endowment for the Humanities.
Visitors to the college are welcome.

Similar programs:
Many universities have American Studies programs with varying emphases. Boston University, American University, and George Washington University, among others, have field study programs relating to cultural institutions in their respective cities.

Contact:
Miles Orvell, Director, American Studies Program, Humanities Building, Temple University, Philadelphia, Pennsylvania 19122, (215) 787-7351/7328.

Steve Harlin

Orvell, Yannella, and Levin examining a nineteenth-century structure in north Philadelphia; Yannella and a student discussing the history of Rittenhouse Square; and Barbara Nevaril conducting a tour at the Pennsylvania Academy of Fine Arts as part of her field study.

spring semester this year working at the Mercer Museum where she was assigned to the butter and cheese room doing research to develop scripts that could be used for tours of school groups. She consulted cookbooks in the museum's library to find out how butter and cheese were used from 1750 to 1850; journals and history books provided evidence on how cheese was made.

Barbara Nevaril, a senior history major, worked two days a week last year at the Pennsylvania Academy of Fine Arts, giving tours and doing research. She was assigned to investigate the feasibility of doing an exhibit on prizes the museum has awarded over the years. After extensive checking, Nevaril determined that the exhibit would require the museum to borrow objects from other collections and to do research that would tie up more people than the institution could spare. The museum staff agreed.

The Temple professor who advised Nevaril and was responsible for grading her field work received a copy of the report along with a summary of the work done and the supervisor's evaluation. Her supervisor, museum education director Betsy Kolowrat, said the program benefited all: "She lightened my load, and I gave her lots of experience."

Besides becoming acquainted with new areas of knowledge, students in the field learn about job possibilities. In a few cases the internships have led to full-time positions. Some students have discovered that careers they planned to enter do not really interest them. The work done away from the university becomes particularly valuable when it complements classroom studies, and undergraduates find themselves taking the kind of broader view the program has sought to encourage. Nevaril, for example, relied on historical material she had studied in order to answer her tour groups' questions about museum paintings. "It all fit together like a jigsaw puzzle," she recalls.

As a variation on the field study, individual community studies have also been part of the program, and many students have reported them to be the best educational experience they had in college. Classes have conducted a number of community surveys in the Philadelphia metropolitan area. The first of these ventures was a study of Lumberton, New Jersey, which Yannella headed in 1974 and 1975. In the seven-week, eight-credit summer course (equivalent to half a semester), a group of 12 students—who were paid with money from the NEH grant—moved into the small New Jersey town to write its history. Yannella, who lived in the town and was its vice mayor, realized that the community was rich in history, though it had never been chronicled. Working 12-hour days, the students scoured local archives, checking deeds and century-old records. They discovered that most buildings in the town of 4,500 people were over 100 years old and that 34 of

them had been built before 1820. Each student was assigned to read five years' worth of local newspapers in the period from 1840 to 1890, and local residents in their seventies and eighties provided oral history.

The students developed into a tightly knit group, spending nights sleeping on Yannella's couch and pitching a tent in his yard. Once a week they held a meeting to plan strategy. Decisions were made collectively. By the end of the course the researchers had accumulated a 40-foot stack of three-by-five filing cards containing their findings. The class presented its results to a public meeting in the town and helped to form Lumberton's historical society. Although they had had little previous experience working with primary sources, the students proved they could do quality research. "They developed real self-confidence," Yannella says. "They felt they could crack any archive."

Despite the success of the research projects, there are no plans to make a community studies course a regular part of the program. The projects are simply too expensive—and too exhausting. "I just can't do one of these a semester," Yannella explains. "I would lose 10 pounds each time."

Even so, professors have incorporated the community studies approach into more conventional classes. In Levin's course The City and the Country, students spent about 40 percent of their time in the field examining communities. After reading Jane Jacobs's discussion of the importance of street corner activities in maintaining a healthy community, several students visited a working-class Italian area of south Philadelphia. They discovered that corner stores still play an important role in the area and are a focus of community life. Other students traveled to nearby rural areas where they heard how encroaching suburbanization with its rising land values is pressuring farmers to sell out. The Temple students talked to farmers who expressed concern about the values their children learn in new suburban schools.

Besides experimenting with work in the field, the Temple staff has tried a variety of teaching techniques in the classroom. Team teaching has been used on several occasions with varying results. Putting two teachers from different disciplines into the same room does not necessarily produce an interdisciplinary class, Orvell notes. One team-taught course that students and faculty have evaluated highly is the one on technology that will become a core course next year. It was taught last spring by Gerald Wheeler, a nuclear physicist, and Levin, whose specialty is the history of architecture. The course traces the development of technological breakthroughs and examines how they have shaped American society. In one unit, Wheeler discussed the development of electric power, and Levin described the installation of the first electric lights on a major Philadelphia street. Students read early twentieth-century leaflets the power company had distributed to explain the new technology. When electric lights replaced gas, the busy downtown street became deserted; people feared these devices that gave off light but produced no odor. Later the class moved to a discussion of nuclear power and whether the fears surrounding it are legitimate. Other subjects in the course were computers, including their possible threat to privacy, and food production.

Wheeler was hired by Temple with the understanding that he would not be doing research. His job is primarily to teach science courses to nonmajors. He says his relationship with his American Studies colleague has worked well. "Our fields are so different we don't mind showing our ignorance outside our areas," he explained. "When Bob is talking I become a student." One area where the two sometimes clash is in grading the midterm, the final, and the research paper required in the course. The professors mark each paper individually; then the two compare results and work out any differences.

Orvell has been trying to develop a core of about 7 to 15 professors who are committed to teaching in the program. Though teachers from traditional disciplines come into American Studies courses with enthusiasm, they have sometimes found that their students' expectations of an interdisciplinary approach are harder to meet than they thought. Students who have come to expect courses that take a broad view sometimes have been disappointed.

An outstanding course taught by an outsider that has become a tradition at the school is Museum Methods, given by John Milley, supervisory curator of Independence National Historical Park. The class, which meets once a week at Temple and once either at Milley's office near Independence Hall or at a museum, provides an overview of how museums operate. Milley acquaints students with the hazards of his profession. In one lecture he presents a pair of brass candlesticks and asks whether they are genuine mid-eighteenth century artifacts. Sharp-eyed students note that the pair are not matched, meaning they have not been cast from the same mold, as authentic candlesticks of the period were.

The students read about museum history and more recent developments in the field. Milley gives no final, but there is a midterm quiz, and each student must research one object. This task often develops into a massive research project as students delve into the background of their artifact. Assigned a group of porcelain figures, a student might begin by learning how porcelain was made, when, and why. The research can become voluminous. The student then writes a paper on the object and summarizes the work in 80 words for a museum label. Although the program is not designed to train curators, 8 of the 50 students who have taken the course since 1974 are either working in museums or are in graduate school studying museum work.

Students have participated in shaping the direction American Studies has taken. Each year, Orvell says, a group of active seniors has given new life to the program, becoming involved with curriculum changes, asking questions, challenging the professors. Every year when the seniors leave, the professors fear that the program's energy will be lost, but Orvell says that new seniors have always appeared to provide a lift. "There is an unusually bright body of students majoring in American Studies," notes the chairman of the sociology department, David Berger, who has taught a course in American Studies. "We need programs like this for the concerned student who wants to become involved. It makes going to school a hell of a lot more than sitting in class."

The program has a reputation for being one of the most demanding in Temple's liberal arts college. While other departments have phased out written work, American Studies courses have mandatory writing assignments. "I came closer in this department to getting a liberal arts education than in any other," says Alan Glicksman, who graduated in 1976 and is now in Temple's graduate school working toward a doctorate in sociology. "The classes were more intellectually rigorous. More individual initiative was demanded." The program also places unusual burdens on the professors who must do extensive reading outside of their specialties in order to prepare for classes. "You have to constantly be learning," Orvell explains. "I don't think you could ever get in an academic rut." ■

From Concrete to Abstract Reasoning: SOAR Plots the Course

by C. Eric Lincoln

Xavier University of Louisiana considers itself distinctive. And in many ways it is. One of its latest claims to distinction is having given its home city New Orleans the first black mayor in its history. (He is former circuit court judge Ernest "Dutch" Morial, who graduated in the class of '51 along with Norman Francis, Xavier's president since 1968.) Another is its fully accredited College of Pharmacy, which for 50 years has placed it in odd contrast to most small black colleges—whose professional schools, if any, have tended to run to seminaries.

Xavier is black and Catholic, and somewhat brash about it, which for these times is perhaps another distinction, for this is an era in which the small church-based college has had to look far beyond its traditional sources of support for help in staying alive, and that help often comes at a very high price. Usually it means a pronounced secularization of the institution and its administration. And usually it requires the traditionally black college to resort to the dubious expedient of labeling itself merely "predominantly black," lest it be cast adrift from a support system based on academic cosmopolitanism.

Despite whatever risks there may be in so uncharacteristic a posture, Xavier still pronounces itself "both black and Catholic" in all of its public literature. In fact, it claims to be "the only black Catholic university in the western hemisphere," a claim not likely to be challenged in the immediate future.

But Xavier is also integrated and cosmopolitan. Forty-five percent of its students are not Catholic. A third of the students in the College of Pharmacy are white, as are about 15 percent of the 1,800 or so men and women who make up the general student body. And while the great majority of Xavierites come from Louisiana and neighboring states, students from a dozen countries—particularly from Latin America and Africa—add to the rich cultural mix for which New Orleans and its environs have long been noted.

The accomplishment that excites the people at Xavier most these days—and which is sure to get enthusiastic mention in any conversation with them—is the high percentage of science graduates that they are sending on to schools of medicine and dentistry or to advanced degree programs at some of the nation's most prestigious institutions. Lacking the expensive, sophisticated teaching resources required by the sciences, and having had in the past a very doubtful entrée into scientific job markets, small black colleges have traditionally steered their students in other directions. But Xavier averages 18 to 20 science students admitted to medical, dental, or graduate school each year, with an additional 20 or so admitted to its own College of Pharmacy, and still another 10 or 12 gaining admission to various programs in medical technology.

At Xavier, student enrollment has increased by 50 percent in the last decade, and the enrollment in science programs, no doubt reflecting new opportunities for black college graduates in a desegregating society, is up by 100 percent. Currently, 40 percent of the students at Xavier are majoring in one of the sciences. Such statistics would have been unthinkable a decade ago.

The 1978 crop of science graduates won admission to medical programs at Harvard, Howard, the University of Florida, Emory, Louisiana State University, Meharry, Dartmouth, Temple, Baylor, the University of South Alabama, the Medical University of South Carolina, the University of Texas, Tulane, and the Chicago College of Osteopathic Medicine. Dental students were accepted at Louisiana State University, Howard, Meharry, and the University of Florida, while students looking for graduate degrees will go to Atlanta University, Louisiana State, Stanford, and the University of Illinois at Urbana.

Considering how stiff the competition is for scarce spaces in American graduate and professional schools, Xavier could conceivably choose to rest a bit on its laurels with a record like this. Instead, challenged by success, the university has launched an experimental effort to enhance its science programs by overcoming some of the problems that beset the beginning science student and produce a high rate of attrition among majors.

The most critical of these problems is the difficulty many students experience in developing the cognitive skills required by traditional courses in science and mathematics. Even students who are otherwise reported as "very bright" or "highly motivated" have not been immune to failure when making the transition from conventional methods of problem solving, based on the concrete and observable, to problem solving that is based on formal, abstract reasoning. This problem is, of course, not limited to black colleges or even to small ones; but it probably makes a disproportionately large contribution to student attrition and to career determination.

Xavier University's answer to the problem is embodied in an experimental project called SOAR, or Stress on Analytical Reasoning. SOAR is in turn part of a comprehensive undertaking called

C. ERIC LINCOLN is professor of religion at Duke University. His essays on education have appeared in Daedalus and the Journal of Negro Education.

Burnell J. Robinson

Harold Vincent helps students investigate the properties of electrical components.

the Kenan Science Project—an interdisciplinary program in science and mathematics sponsored by the Kenan Educational Fund of the Southern Regional Educational Board. The Kenan project is aimed at reducing the attrition rate, and increasing the performance levels of students in introductory courses offered by the several participating departments.

SOAR was initiated at Xavier in the summer of 1976 by JW Carmichael, a young professor of chemistry who found himself looking for a way to reach the "unreachables" who, with high hopes of preparing for careers in science or medicine, routinely registered for his courses and then flunked out. Concerned that there was something wrong with his teaching methods, Carmichael began to compare notes with his colleagues teaching science courses in other departments at Xavier and at other colleges across the country. He found that teaching procedures using the lecture/lab method were much the same everywhere, and so was the flunk-out rate. Indeed, many departments made no attempt to distinguish between students who were unusually dull and those who were unusually bright, only between those who got through their introductory science or math courses and those who didn't.

A certain percentage of failures was considered predictable in most cases, and this was seen as a painless, automatic means of controlling the size of the class. But this seemed unsatisfactory to Carmichael, who was especially bothered by the fact that at Xavier there seemed to be little correlation between the extra help a student might receive from a concerned instructor and that student's progress in comprehension. There seemed to be a gap somewhere that was not being negotiated.

More consultation and comparison of notes with his colleagues led Carmichael to the exploration of a few scattered teaching programs based on the theories of Jean Piaget, the Swiss epistemologist. Piaget's theories of learning were based on his extensive work with children. Though known in this country since the 1920s, they have received but scant recognition among American psychologists and educators until quite recently. The discovery that Piaget and his colleagues understood and described with convincing accuracy two decades ago certain problems that contemporary college students have with abstract reasoning sent many professors to the stacks to take a second look at the theorist's *Growth of Logical Thinking From Childhood to Adolescence*. Robert Karplus at the University of California at Berkeley pioneered in the development of the "Learning Cycle," a functional strategy for putting Piaget's theories to work in the college classroom, and a handful of others such as Arnold Arons at the University of Washington and John Renner at the University of Oklahoma manned scattered outposts of Piagetian activity in the academic establishment.

They were a lonely crowd, but their work was not without reward or notice. In 1975, under the leadership of Robert G. Fuller, a physicist, the University of Nebraska launched a year-long program for freshmen involving physics, anthropology, mathematics, English, history, and economics in a multidisciplinary effort to use the Learning Cycle strategy in all classes, with particular stress on the patterns of reasoning common to the several disciplines involved. The program was called ADAPT, or Accent on Developing Abstract Processes of Thought. Other Piagetian-based programs are DOORS (Development of Operational Reading Skills) at Illinois Central College; STAR (Steps to Abstract Reasoning) at Metropolitan State College in Denver; the Cognitive Program at Essex County College in Newark, New Jersey; and SOAR at Xavier. The SOAR faculty has attended workshops conducted by ADAPT's Robert Fuller and Berkeley's Robert Karplus. Although the three programs are all fully independent, there is a continuing reciprocity of information among professors.

Briefly stated, Piaget's argument is that intellectual development is a process that is advanced by change and adaptation whenever people encounter new information that is inconsonant with their habitual mode of reasoning. Known as "self-regulation," this is a lifelong process. Piaget posits four distinguishable intellectual stages through which individuals pass as they develop from infancy to maturity: sensory-motor, pre-operational, concrete operational, and formal operational. It is the last two stages that are thought to have pertinence for college-level instruction. Piaget's original experiments with Swiss children demonstrated that the third, or concrete operational stage gave way to the fourth, or formal operational stage, at some point between ages 11 and 15. More recent studies suggest, however, that perhaps 50 percent or more of American college freshmen have not made this transition by the time they arrive on campus.

In the concrete operational stage, reasoning is limited to dealing with empir-

ical data communicated by direct sensory experience. This excludes the mathematical and logical relationships that are the essential data of scientific inquiry and communication. In the formal operational stage, however, individuals develop and refine a capacity for proportional reasoning, the separation of variables, the elimination of contradictions, and similar intellectual chores that are partially or altogether independent of empirical registration. However, since the intellectual process must begin with *some* experience, no matter how remote, the learner may at times operate on both the concrete and formal planes simultaneously, depending upon the data he has encountered.

The new Piagetians are convinced that the problem they are faced with is essentially pedagogical and not a reflection of students' lack of ability. While they concede that certain cultural deprivations can inhibit students' readiness for transition to the formal stage of operations, the true problem, they believe, lies in academe's conventional approach to science instruction, which presupposes an unobstructed channel of communication between professor and student.

What has been overlooked is the fact that the typical college freshman has not had sufficient experience at the formal operational level to readily accomplish the self-regulation required to integrate and internalize the new information suddenly thrust upon him. Some do make the transition without trauma. A few others memorize vast numbers of formulas and rote procedures without ever understanding the abstract relationships they represent, or the theories probed by the laboratory experiments. Many remain confused, and, if they are fortunate, find their way into other disciplines where the concrete operational mode is sufficient to meet a different order of requirements.

Since the typical freshman is concrete operational, that is the level at which his college development must begin. Contemporary Piagetian programs present students with familiar empirical data, but only to help them draw conclusions about the relations between the properties they are observing and the opportunity for testing these conclusions in the laboratory or by discussion. The Learning Cycle developed by Karplus at Berkeley has three phases: The first is Exploration, in which the student encounters empirical data that is in conflict with his traditional pattern of dealing with reality. The second is the Invention phase, in which analysis is called for, and the student is encouraged to discuss the data with other students and to try to organize it and draw conclusions from it by a process of trial and rejection.

The final phase is Application, which requires further experimentation, analysis, and refinement, and which allows the individual to apply the concepts he has learned through Invention. There are some hazards: The problem must be realistic in the sense that the student has a real chance of grasping it and moving toward a solution. At the same time, the problem must be so constructed that the solution cannot be accomplished by mere memorization but will require students to think for themselves.

At Xavier Piagetian theory was first introduced in the summer of 1976. The pilot project was designed for entering students in the premedical program. Carmichael developed the preliminary materials, and with the assistance of Clarence Inniss of the department of mathematics and two medical students, he launched the five-week program with an enrollment of 26. Preliminary testing showed at least 8 of these students to be operating at the formal level of development, while 12 were still at the concrete level. Five weeks later, post-project testing showed the ratio of formal to concrete development to be exactly reversed: 12 to 8.

Encouraged by the results of the pilot project, Xavier ambitiously expanded it in 1977 to include the joint efforts of the departments of biology, chemistry, computer science, mathematics, and physics. With this extended commitment came a highly enthusiastic corps of young professors who were apparently free of the reservations and foot-dragging so familiar in academe. The objects of the new program were:

> (1) to provide experiences which will enable the students to increase their level of cognitive development;
>
> (2) to provide the opportunity to review the basic reading, note-taking, and visualization skills necessary for success in college; and
>
> (3) to provide motivation and relief from some of the anxieties associated with majoring in science or mathematics.

The program itself was aimed at developing in students five of the major mental skills intrinsic to the formal level of cognitive development. These include the abilities to control variables, to use proportional reasoning, to use probabilistic reasoning, to use combinatorial logic, and to recognize correlations between variables. Representatives from each of the five participating disciplines then developed Learning Cycle ac-

Burrell J. Robinson

Johnette Hassell and students use Xavier's computer.

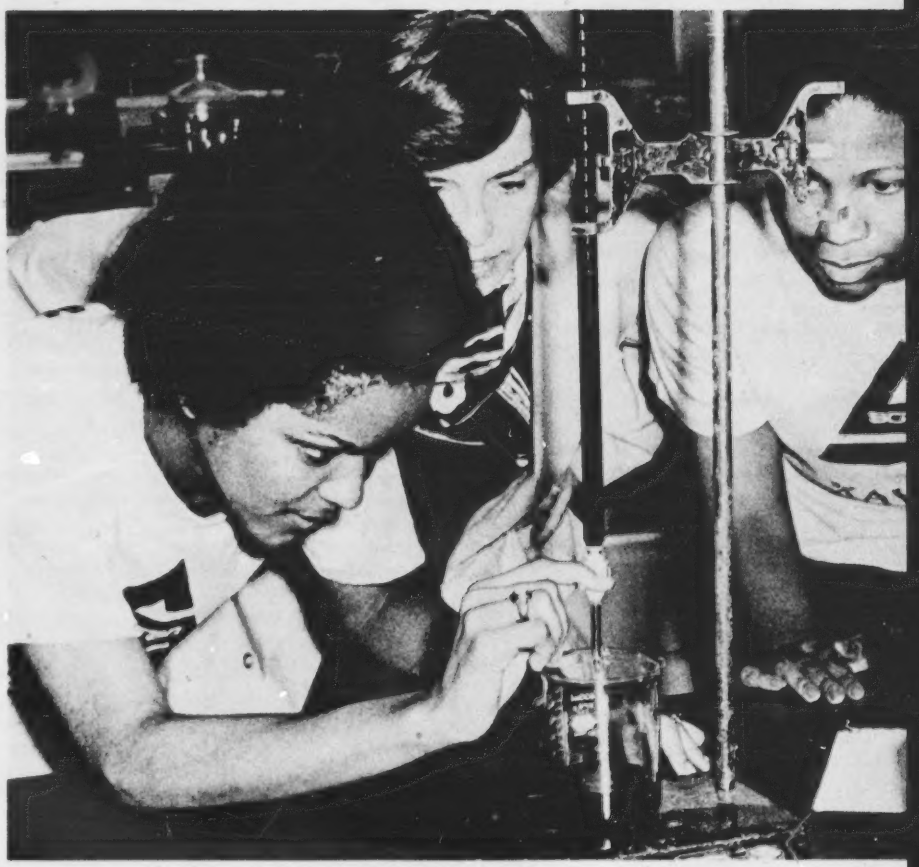
tivities emphasizing each of these mental structures—the objective being to present an actual problem from each discipline requiring the use of the specified skills.

Provisions were made for students deficient in reading or visualization skills, and motivation was heightened through field trips, peer discussions, social events, and ready, informal access to the faculty involved. Peer group tutors or "learning assistants" served as role models. The whole program was structured to cover a six-week unit. In preparation, the learning assistants spent a week learning the basics of Piagetian theory and its application to college teaching and rehearsing the activities in which the incoming freshmen would be engaged. Robert Karplus's workbook, *Science Teaching and the Development of Reasoning*, was adopted as a primary text for training the learning assistants.

Fifty-seven randomly selected students enrolled in the 1977 summer program. The first week was given over to orientation, testing, and social activities designed to promote group spirit, but four Piagetian workshops teaching classification of data and graphing skills were also introduced. For the five weeks remaining, a three-hour problem-solving laboratory was held each morning. The typical afternoon was devoted to training in supplementary skills, field trips, career counseling, and social activities. Each week began with a large group assembly where upcoming activities were outlined and students were given the opportunity to ask questions about the program. At the end of the week students summarized what they had learned and discussed how it might be applied to the real world.

For each of the problem-solving laboratories students were divided into five groups. The labs were conducted by the same full-time instructors who had developed the course materials; learning assistants were assigned to aid them. The low student/faculty ratio (about 6:1, assuming faculty status for the learning assistants) permitted intensive individual attention to each student.

Most of the lab problems were refinements of those developed for the pilot project the previous summer. In a typical week, devoted for example to teaching the skill of proportional reasoning, the biology lab might address the subject of "geologic time," presenting as its problem the abstract representation of geologic eras. In chemistry students might study "the burning of magnesium in air," the problem being to determine the relationship between the amount of the reagent and the product. The computer science lab, in studying "shadows," might seek to instill an understanding of the meaning of the length of shadows under varying conditions; while in mathematics the subject "classification of plane figures with three sides" might involve students in constructing paper triangles designed to yield certain trigonometric ratios.



Mary Ann Ryan demonstrates a physics lab procedure.

In physics, finally, a box of assorted rubber bands might help illustrate the subject "forces that move objects." All of the problems and all of the experiments pertain to proportional reasoning, even though each of the several disciplines provides a different set of materials and formulas.

Correspondingly, to develop in students the skill of recognizing correlations, the biology laboratory might deal with the effect of hormones on the physical characteristics of fresh-water algae, math with the graphing of scattergrams, and physics with the relationships between variables in direct current circuits. During the same week this mental structure is being studied, computer science might demonstrate computer simulation of battles and resultant possible variables, while chemistry might illustrate the relationship between concentration and the length of time blue color persists. The student will observe, for example, that the flagellates he sees in the biology lab wiggle; or he will learn in the physics lab that some electrical circuits don't shock. These are the empirical data, but the critical learning comes only when the student recognizes correlations among these variables.

By now, SOAR has gotten considerable attention in the local press, as well as in academe. Johnette Hassell, associate professor of computer science at Xavier, presented a paper on SOAR at the national meeting of the Association for Computer Machinery in Detroit in February of 1978, and SOAR was featured in *Chemical and Engineering News* (October, 1977). The Xavier experiment is included among the five projects discussed in *Multidisciplinary Piagetian-*

Burnell J. Robinson

Based Programs for College Freshmen, published by the ADAPT Program at the University of Nebraska, and it will be discussed by a panel led by Jacqueline Hunter, assistant professor of biology at Xavier, at the 1978-79 meeting of the National Science Teachers Association.

The inevitable questions are: How good is it? and, Is the publicity about it premature? The short answer to the first question is: Nobody knows. And to the second: Time will tell. So far, the only hard evidence is the pilot program of 1976 and the summer program of 1977. The available statistics are encouraging but incomplete. Tests given before and after the 1977 summer program indicate that in six weeks 32 of 40 students made significant improvement in their abilities to operate at the formal level of cognition. Three lost ground, and two of those who showed no change were already performing at an optimum level, so no significant change was expected.

On the basis of what they have seen so far, the SOAR faculty at Xavier is cautious but enthusiastic. The instructional materials are now being modified and supplemented, and the teaching strategies developed in SOAR are being incorporated into freshman and sophomore courses in math and science. SOAR math instructor Lester W. Jones predicts that the new procedures will go a long way toward taking the fear out of mathematics, an appraisal endorsed by colleague Harold Vincent, who teaches physics and pre-engineering. Mary Ann Ryan of Xavier's chemistry department has already developed materials to cover a full year of laboratory classes, simply on the basis of student response. Other year-long programs are planned for biology, math, and physics.

Student response to SOAR has been uniformly positive, although there are some gripes about various specifics. Valerie Clemmons, a freshman chemistry major who wants to study medicine, thought the program was "very good all the way around." She was particularly impressed by how quickly she learned to "understand what the professor was talking about," something which had caused her great apprehension previously and had almost made her decide on a different career. Byron Kelly, a freshman from St. Louis who also wants to study medicine, was sure that he would have "been able to get it anyway; but the way they teach it here makes it a whole lot easier."

The Kenan foundation is sufficiently impressed with SOAR to continue funding it through 1979. There will be some minor modifications: The 1978 summer program will last seven weeks instead of the original six, covering the same material. The five-person faculty with five learning assistants will be augmented by five high school teachers, five Xavier graduates currently enrolled in medical or dental school, and at least five work-study peer counselors. Student enrollment will be limited to 140 (out of more than 220 applicants).

The word has gotten around. The pilot program in 1976, to borrow the words of its principal architect, used a "warm body selection process." That is, anyone who registered as a math or science major was fair game for recruitment. A not-too-subtle form of advertising (silk-screened T-shirts featuring SOAR in oversized letters) lent presence as well as an element of mystery and exclusiveness to the program. SOAR students sought each other out and were often seen in informal situations with the SOAR faculty. Best of all, they got full academic credit for the program. When individual SOAR students in some of the regular classes began to assume academic leadership, SOAR's campus identity took on solidity. Students who heard about the program from their high school teachers, or who read about it in the press, began applying to SOAR at the same time they sought admission to the college. In the meantime, the SOAR faculty has not been idle. Not only do they search admission records for potential candidates for their program, but they recruit actively in the high schools as well.

Obviously, a lot of time, energy, and commitment have gone into SOAR—factors not always considered when a small institution like Xavier takes stock of its assets, or tries to determine the relative cost-effectiveness of its faculty. Nobody appreciates this more than JW Carmichael, who stresses the fact that "this kind of project has to be cooperative. It can't be a one-man show." President Francis's reaction to SOAR was heartening. Of its faculty he says: "What they do, and how they do it, is what counts. If it's for Xavier, and if it's good for Xavier, it's equivalent to whatever anybody else is doing. It's not their project; it's our project. SOAR is not only good for Xavier; it's part of Xavier. It's part of what we're doing and part of what we are." ■

Learning experience:
Project SOAR: Piagetian-based, pre-freshman summer program for science majors. No prerequisites. Enrollment: 60-120 per summer.

Other descriptions:
"Program Aims at Improving Abstract Reasoning," *Chemical and Engineering News*, October 17, 1977, p. 25.
"Multidisciplinary, Piagetian-Based Programs for College Freshmen," special publication of ADAPT, 213 Ferguson Hall, University of Nebraska at Lincoln, Lincoln, NE 68588.

Similar programs:
None specifically aimed at science or minority students. Programs aimed at a broader base of college freshmen include those at the University of Nebraska, Lincoln (ADAPT); Essex County College, Newark, New Jersey (the Cognitive Program); Illinois Central College, Peoria (DOORS); Metropolitan State College, Denver, Colorado (STAR).

Contact:
JW Carmichael, Jr., Department of Chemistry, Xavier University of Louisiana, 7325 Palmetto, New Orleans, Louisiana 70125, (504) 486-7411, X358.

A Thematic Approach to Concerns of the Future

by Nathaniel Sheppard, Jr.

When the University of Wisconsin-Green Bay (UWGB) was chartered by the state legislature in 1965, it was charged with a special mandate: to forge an innovative approach to the concerns of the future. Reflecting the rising public sentiments of the sixties, its curriculum was to focus on solving problems related to the environment. The campus is located near the mouth of Lake Michigan's Green Bay, in a region rich with farmland, forests, and small cities and abundant with wildlife, waterfowl, and commercially important fish. The region's thriving paper industry presented an opportunity to examine and deal with water and air pollution, while natural areas, such as the Bay Beach Wildlife Sanctuary, could serve as laboratories for studying ecological systems.

But Green Bay's emphasis on the environment has not been limited to biophysical characteristics. Social, cultural, and aesthetic questions all enter into a curriculum that studies environmental issues in their broadest context. Chancellor Edward W. Weidner cites the business administration or accounting student who would look not only at techniques for financial success but also at the impact of industry on water and air quality: Is the most efficient and most cost-effective way of conducting business consistent with responsible resource management and environmental protection? "Or the art student who might examine business's support of the arts," Weidner says, "because in a city like Green Bay, support from business may mean the difference between having or not having the arts."

The undergirding philosophy at UWGB is that students should be taught to apply knowledge rather than simply to amass it. Avenues for exploration are plentiful, among them: pollution of the Great Lakes, environmental home design, the development of solar energy devices, and the search for an ideal balance between recreation and the natural environment.

In the university's curriculum, practice follows rhetoric. Last year students studying environmental science set up an environmental laboratory in the wildlife sanctuary where they worked as naturalists. One group studied waterfowl while another studied algae and bacteria. Yet another group examined the nutrients in fish feeding grounds.

Other students studied the biological productivity of the marshland—the highest concentration of marshland along the northern portion of Lake Michigan—which serves as a nursing ground for fish and a feeding place for wildlife. Another group researched the life history of the yellow perch, a valuable game fish in the region. Each of the projects related to concerns of the people in the region. Students studying urban affairs put their teachings into practice too. David M. Littig, who teaches a variety of interdisciplinary courses in urban analysis, cites joint projects with neighborhood rehabilitation groups. In the Astor section of the city of Green Bay, for example, students worked with the neighborhood planning board to develop a riverfront park along the Fox River near the neighborhood. The students helped answer such questions as: What uses should be made of the park? What transportation would service it? What impact would the park have on the level of pedestrian and vehicular traffic in the neighborhood?

The curriculum is set up around problem-centered units called "concentrations," which serve as majors for students and as departments for faculty. There are nine concentrations at UWGB, organized around basic long-term issues. They are science and environmental change, social change and development, regional analysis, urban studies, human development, humanistic studies, communication and the arts, human biology (including nutritional sciences, human adaptability, and population dynamics), and managerial systems. The concentrations are divided among four theme colleges: environmental sciences, creative communication, community sciences, and human biology.

The College of Environmental Sciences has two units—one concerned with efforts to control the environment and the other with analysis of ecological systems. In creative communication, there also are two problem-oriented

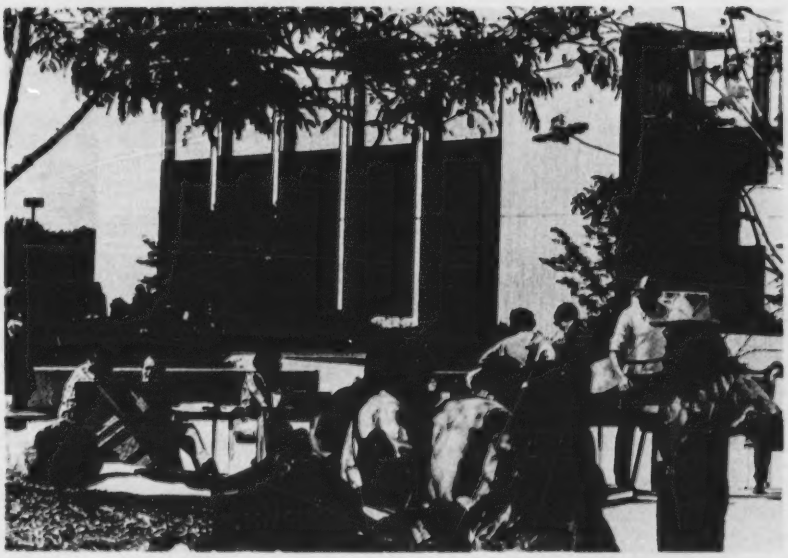
NATHANIEL SHEPPARD, JR., is a Chicago correspondent for the New York Times.

departments—one focused on communication and the arts, including aesthetic awareness and environmental design, and the other on humanistic studies. Community sciences includes social change and development and regional analysis and urban studies In the College of Human Biology, there are four departments—two jointly concerned with population dynamics and the nutritional sciences as a tool to cope with the world hunger crisis, and two focusing on human growth and development from cradle to grave.

Since there are few requirements in the four theme colleges, students have wide latitude in choosing courses within the different disciplines. Many design their own courses of study around a field of their own choosing, a philosophy which some argue works better on paper than in practice. In the beginning, the university's curriculum was much less structured than it is now. Over the years, however, Green Bay has modified the program of study in response to bewildered students and some critical parents and faculty. "Our principal mistake 12 years ago during planning was to assume there would be a student body from a varied background which could adapt to a problem-focused education without help," says Weidner. "We thought they would come in, select a problem, get excited about it, and set up their own course of study."

The conflict between the traditionalists and the innovators in part reflects the peculiar makeup of the undergraduate student body. Green Bay began with a sizeable number of students from cosmopolitan East Coast cities. The local residents, perhaps fearing that the students would provoke a repetition of the antiwar protests that had plagued the state campus at Madison, resented them, arguing that they were elitist and overcritical. About the same time, the state legislature raised tuition for out-of-state students to its present level of about three times that for local students. This in part accounts for the drop in undergraduate enrollment from a high of 3,773 in 1974 to the current 3,322. (The university's fledgling graduate program, on the other hand, began in the fall of 1974 with 170 students and has almost doubled in size to 320, bringing the total enrollment to 3,642.)

The current crop of undergraduates are overwhelmingly (90 percent) local, and most of them commute, since the state has refused to provide dormitory space. A full third of the undergraduates attend part time and are over 25 years of age. As Weidner explains it, "Most of the regional students represent first-generation higher education students in their families and many of the families are not supportive of students. To them going to college may seem like alienation and a waste of resources. The students need a shorthand explanation to tell their parents what it is they are studying. Population problems and urban analysis sound far out," he says, "while familiar subjects, such as chemistry and business administration, do not. We have tried to address these problems by showing how our attention to problem solving helps meet the needs of the community and the region."



Top: One of UWGB's outdoor plazas. Bottom: Charles Matter, associate dean, left, and George Rupp, dean for academic affairs.

Martin H. Greenberg, associate professor of regional analysis and former director of graduate studies, points out that "the national trend in education has its emphasis on vocational education, and northeast Wisconsin has the lowest number of students in the state—27 percent—who go on to postsecondary education. The economy in the region is strong and kids can come out of high school and get a job at a paper mill and earn $14,000 a year, which goes a long way here." The problem is compounded, according to George Rupp, dean of academic affairs, "because of our stereotype as Eco U—that all we are about is ecology—and our image as an elitist institution."

Addressing this identity question has

A student does field work as a counselor for sixth-grade girls.

been a ticklish affair, and according to Rupp two factions have lined up on campus, "one that says let's become totally conventional and simply give students the tools they will need to compete for jobs, and another that says let's stick with our tradition of innovation and not bow to the region."

"I think we can do some of both," he says, "and we'd better because it is not intellectually defensible to talk of the program being one way or the other."

For a long time, a symbol of the controversy was the now abandoned University Seminars Program (USP), under which students were required to take a total of 18 credits from a list of prescribed courses. During the freshman year they had to choose four seven-week modules from among such topics as: the human condition in world perspective; technology and human values; resource utilization and the American character; crisis in communication; and contemporary moral problems. During the sophomore and junior years, they were required to design and work in community projects that developed from their freshman studies, in addition to electing to study in one of the four theme colleges. In the senior year students from all concentrations in all four colleges again came together for an exchange of ideas on a variety of themes such as: science and futurity; madness, insight, and creativity; and American minds in modern society.

"The courses were not allied with any particular unit of study and students often saw them as unrelated to their majors," says Associate Dean Charles Matter, commenting on the causes for discontent with USP. "Students now are more career oriented and grade conscious and they often will ask, 'Why am I taking this course?' "

In a concession to traditionalists, beginning in the fall, the university will replace USP with a new set of "all-university requirements," which up the required credit hours to 30 in a two-part program: 27 credits in liberal education and distribution; 3 credits in senior seminar. The more structured study calls for nine hours each in the humanities, natural sciences, and social sciences. Six of the nine credits in each area must be taken as a related two-course sequence. In the humanities, for example, freedom and individuality may be paired with problems in ethics, or introduction to literature may be paired with humanistic values through literature. The remaining three credits must be chosen from a list of courses approved for distribution and bearing some relationship to the major. "The new all-university requirements represent a compromise between the forces advocating a shift toward a more traditional approach to learning, with courses allied to some unit of study, and forces advocating adherence to the original innovative approach, in which core courses were free standing," Dean Matter explains. "The controversy is far from over, however. The pot is being stirred but it is unclear how it will jell."

To develop their own concentrations, students first select a problem, then try to solve it through studies in several concentrations. As a result, students with a common major seldom take identical courses, and many of the courses they do choose take them far beyond the campus. One student, for example, wanted to major in anthropology when she came to the university five years ago. Since no anthropology major was offered at that time, she designed her own personal concentration—a study of other cultures through museology. Working with a faculty adviser, the student designed 15 credits' worth of classes, including internships in museums in Santa Fe, Milwaukee, and Green Bay. One self-designed course, The Cultural Landscape of Cemeteries, allowed her to explore the relationship between architectural design and the economic and ethnic makeup of cemeteries. "It's possible to set up your own major," this student said, "but there is a lot of red tape, which at times makes it seem impossible. The hardest thing is convincing them that your proposal re-

Learning experience:
An entire curriculum that studies environmental issues in their broadest context. Nine concentrations are divided among four colleges: Environmental Sciences, Creative Communications, Community Sciences, and Human Biology. Enrollment: 3,322 undergraduates, 320 graduates.

Contact:
David M. Littig, Urban Analysis Concentration, University of Wisconsin-Green Bay, Green Bay, Wisconsin, (414) 465-2355/2531.

Students practice mapping and land-use analysis at a UWGB field station 50 miles from campus.

lates to the school's mission."

Student attitudes on the innovative approach were mixed. Some agreed with the senior that designing your own courses is easier said than done, yet others found it a breeze. One group of students, chatting in a lounge area, expressed their feeling that since getting a single course added to the curriculum was so difficult, designing an entire course of study could not be done.

"A group of students sought to replace two social science modernization courses that were heavily western in perspective with two Marxist courses," one student said. "Twenty of the sixty students in the social change and development area voted 16 to 4 for the change but the faculty voted 6 to 3 to keep the two original courses and add another that would be predominantly Marxist in perspective." A flap developed over the faculty having the final say in the dispute, and a student/faculty committee was formed; but the matter remains unresolved.

Another student contrasted UWGB with two other universities where he had studied. "The schools in Texas and Oklahoma dealt with old-fashioned issues. In history courses we talked about who fought who and in business classes it was strictly about competition. You were told that if you worked hard and were a good fellow you would make it," the student said. "Here you can develop your own type of thinking and not have a professor force his attitude on you, because you seek solutions to the same problem in several different classes and no one solution is held up as the only solution."

Adequate yardsticks for measuring the effectiveness of the UWGB programs are hard to come by, administrators assert, because the university is only 12 years old. They point out that much of the university's impact on society will be long-range and indirect, and can be gauged through such things as its influence on other educational institutions. In this last area the university has found some evidence of support for its philosophy. Green Bay was among five American colleges under study by the Swedish Ministry of Education pursuant to reform of that country's educational system. It was selected, Weidner says, because of its field work component and because its thematic approach to learning was considered unusual and important. In addition, UWGB has recently completed a major curriculum development project for Bu Ali Sina University in Iran.

In the summer of 1977, Chancellor Weidner invited a number of prominent educators, under the rubric National Advisory Panel on Education, to assess Green Bay's accomplishments and to look to the future—anticipating changing educational needs within the region. The panel, which includes Paul L. Dressel, Lewis B. Mayhew, Frederick Harrington, Samuel B. Gould, and Charles Wedemeyer, is currently making a comprehensive study of the campus curriculum and will issue recommendations next year for the university's course in the decades ahead. Meanwhile, UWGB continues to monitor the future. ■

Fine Tuning the Student Consciousness

"There is an openness to new endeavors now," says George Morgan of Brown University, "but 15 years ago, trying any innovation was like lifting a ton of weight." Morgan should know: He's been professor without departmental designation at Brown since 1958, a distinction he alone holds, and his interdisciplinary work has had a powerful impact on Brown's curriculum—as well as on hundreds of students.

A genial, graying Viennese, Morgan projects a constant wonder and a quiet determination not to swallow unquestioningly anybody's pronouncements about anything. Passing a low-hanging apple bough, he coaxes it down for you to sniff; he has been known to send classes out the door with an assignment to smell the flowers. His career history reinforces the image of a man not known for compromising on his convictions.

Earning his PhD in the physical sciences in 1950, Morgan taught and did research in applied mathematics at Brown for six years. In 1956 he took a two-year leave for special study, mostly at Harvard, "because I wanted to change directions, to decide what I was going to do from then on," he explains. "I was successful as a professor, but I felt my work had to be more clearly directed toward human questions—the ones that deal with racial strife, relations between men and women, and the like. I thought that perhaps I could use mathematical analysis in human affairs. But other questions became much more important. There were attempts to gain scientific knowledge of man; was this possible? What was done to man in the course of pursuing this knowledge? The kind of science being carried on just wasn't good science; the attempts mutated the subject. I wondered, How do you gain knowledge of man—through science or literature or what?"

Out of these ponderings grew University Courses in Interdisciplinary Studies, a series that began with Modes of Experience: Science, History, Philosophy, and the Arts. Back at Brown, he taught this course along with applied mathematics. "But I didn't want to continue in this half-and-half fashion," he says. "I wanted to give all my energies to the University Courses." So Morgan resigned from applied mathematics and got the nondesignated appointment.

No longer offered, Modes of Experience was described in the catalog as an attempt to foster "a synoptic understanding of four major forms of order and meaning and...a balanced development of the corresponding human faculties." Assigning readings from Galileo to Keats, and Mumford to Vermeer, Morgan strove to help students see "the richness and variety of experience and overcome the first, often fatal, obstacles blocking a wider and juster view of things—a view that recognizes the common ground as well as the distinct characters of various areas of human life."

Once the University Courses were going at full throttle, other professors joined in. New courses arise as faculty propose them, and they are offered as often as the professors are willing to teach them. Open to sophomores, juniors, and seniors, the courses are electives, though occasionally they are included in concentrations such as religious studies. There are far more applicants than spaces; admission is granted on the basis of academic achievement, but an underachiever with high promise may be taken. Current and past course titles include The European Conscience in the Twentieth Century, The United States and Vietnam, The Expert and the City, and Computers and Society.

Physics professor George Seidel teaches Energy, Man, and the Environment, which evolved out of work he did 10 years ago. "At that time I was interested in new ways to present science to nonscientists," he says. "Using energy as a vehicle for teaching introductory physics, I discovered I was more interested in the nonscience aspects of energy." In his University Course Seidel introduces nonscientific material related to energy use, discussing, for example, how a refrigerator works, why it works that way, and what the consumer wants. Then he goes into why our society has refrigerators instead of drying food in the sun. "I try to build an awareness of our relationship to the world in terms of energy," he says. "There's a very active debate going on now as to the directions society should take—about technology as it relates to humans."

In 1967 Morgan initiated an interdisciplinary concentration called Human Studies, which, he felt, compelled students to be involved in their education to an extraordinary degree: Instead of falling (or being pushed) into a defined major, they had to select a human issue and decide which disciplines could contribute to an understanding of it. Thus they learned not only about the topic but about the scope and limitations of various areas of inquiry.

The program also had a positive effect on faculty: More ideas for interdisciplinary courses sprouted, and members of the Committee on Human Studies told Morgan, its chairman, that this was the one university committee on which they were glad to serve because its work had such high intellectual content. Human Studies became the second largest concentration in the humanities.

Disappointment was rampant, therefore, when Morgan discontinued the program in 1974. "It had grown so in size and quality that we had to struggle to maintain it. We didn't have the support we needed from the administration and from many departmentally minded faculty," Morgan laments. But the experience had a lasting influence on Brown's curriculum; Morgan thinks the demise of the Human Studies program helped foster stronger support for future interdisciplinary ventures by serving as an example of the need for institution-wide commitment to new efforts.

Arnold Weinstein, professor of comparative literature and French, reports that "many departments have

incorporated the best features of George Morgan. A lot of what I do in my literature courses is influenced by my having served on the Human Studies committee. The idea is not only to create a synthesis, but to look at other things from the standpoint of literature. I'd like to teach a University Course after I get to know a little more: Once you leave literature you're opening the door not just to one other discipline but to the notion that all others may be related. This is a natural problem for serious interdisciplinary work—not to have authority in all the areas you would like to bring to bear on your own."

Another legacy of the program: Some students are pursuing independent concentrations instead of majors. Alfred Kohn, for instance, calls his concentration Normativism: A Philosophy for Self and Society. "[In college] we are taught how to calculate, analyze data, hypothesize, and research," his proposal reads. "We are schooled in relating the events of the past, describing what is happening now, and predicting what tomorrow will bring. Unfortunately, this education is incomplete. An empirical or descriptive approach omits questioning how things ought to be. And it is such a normative perspective around which I seek to construct my concentration. When the political scientist describes policy-making procedure, I want to know if this is how policy should be made; when the psychologist explains how individuals deal with failure, I ask whether there is a healthier way;...when the philosopher talks about the kinds of knowledge people have, I am curious about what kinds we ought to have."

Among the courses Kohn is taking is Morgan's year-long Conceptions of Man: Diversity and Coherence, in which 30 students split into two groups to discuss values, freedom, and the orthodox scientific approach to understanding man. "The readings range from analytical to philosophical to fiction," Kohn says, "crossing as many disciplines as you can name. This is a fantastic course, but it could even make it by default—if it were judged by the absence of courses and professors studying the human as a whole, not a fragmented, being."

A final project is required in the course. Psychology major Wendy Warring and history major Bill Bernstein did theirs together, addressing, in written dialogue, the question, How does a concept of man inform your life? "We tried to integrate what we'd read with our thoughts and experiences," Bernstein says. "It was a harrowing, draining process. We argued, challenged each other, got angry. But when it was done—what a paper."

In another of Morgan's courses, Possibilities for Social Reconstruction, the class tries "to identify and critically examine basic assumptions and characteristics of practices and institutions in advanced industrial society and consider alternatives that seem more conducive to human needs and fulfillment." Lewis Mumford's *The Pentagon of Power* and Ivan Illich's *Tools for Conviviality* are read, along with other works. Each student also does an individual study to share with the class. Susan Steinmetz was surprised at the depth her paper turned out to have: "When I proposed it, I intended to write about the ways we define work, integrating a nine-to-five job into the rest of our lives, the matter of leisure, and so on. But I wound up with concrete proposals for social reconstruction." She attributes the fine tuning of her consciousness to Morgan's influence: "There's no product in this course in terms of what you learn; it's very much a process. Mr. Morgan inspires us to a poignant kind of searching."

Adds Alfred Kohn, "The courses aren't really interdisciplinary; they're sort of a goulash. They're about the understanding of issues that touch on the very core of what it means to be human. They raise the questions most courses avoid because they're so damn difficult. Mr. Morgan's courses wind up rebelling against customary approaches. His lectures, discussions, and readings virtually shout out to the student not only the value of this kind of intellectual enterprise but the deficits of most courses today. There's a constant urge to sum it up and say what are you really left with. I came out with more questions than I had when I came in, and I think that's more than sufficient. It's a process of searching that won't end when I pick up my diploma."

Deeply emotional experiences are common in Morgan's classes; he seems to have an unerring knack for touching a personal nerve in a reassuring and encouraging way. Students, present and former, claim to have achieved a very personal companionship with classmates. This visceral camaraderie is an accomplishment Morgan wears with pride and works at preserving. He gets students together with his wife and teenage daughter for potluck dinners and other activities, and he touches base often with hundreds of ex-students, some who graduated a dozen years ago. For years he ran postbaccalaureate seminars in his home; groups of eight or nine spent long weekends of conversation, cooking, and play. Students' letters to Morgan are full of phrases like, "It's hard to understand how a university professor can become one of the most important people in our lives"; "I eagerly looked forward to every meeting as holding the possibility for life-giving reflection and sharing"; "I cannot begin to express the growth [that] has taken place within me as a result of this course."

That many of his students have become teachers and set up courses similar to his at institutions like Indiana University, St. Mary's University in Halifax, and the University of Texas —as well as "kept their learning alive," as he puts it—assures Morgan that his courses have provided what he wished for his students and for many others: an inspiration to work at understanding humanity by questioning the most basic assumptions about it. "It's not just that you teach the people you teach," Morgan says. "You also teach the people who come in contact with the people you teach."

For more information: George W. Morgan, Box F, Brown University, Providence, RI 02912, (401) 863-2139.

Redistributing the Responsibility for Learning

"The first thing we teach you at Hampshire is not to believe anything you read," says Raymond Coppinger, professor of biology. "When I was at Amherst I'd reel off the biological facts of life; here I tell you how to find them." At Hampshire College in Amherst, Massachusetts, a verdant campus encircled by ranch houses and milk cows in the Connecticut River Valley, there isn't an introductory or survey course to be had. Methodological and research skills are the fare; the Hampshire ideal is scholarship with a capital S, learning the way a scholar does.

Opened in 1970 (see "Freedom and Identity at Hampshire College," *Change*, November 1977), Hampshire was a threefold experiment. There are no credits or grades; an interdisciplinary organization replaces departments; and a contract review system replaces tenure, with three- to seven-year faculty contracts renegotiable after review. The college consists of four schools: Humanities and Arts, Language and Communication, Natural Science, and Social Science.

Eschewing the usual freshman-to-senior sequence, Hampshire slices its curriculum into three divisions. Students may finish in three years, but most take four or more. Passage from one division to another hangs on examinations, which in divisions I and III are actually research projects; there are four after division I (one for each school), one after division II (essentially a detailed evaluation), and one after division III. Satisfactory performance on all six is required for graduation, but there is flexibility in completion time: A student can begin division II humanities, for example, if he passes the division I humanities examination, without waiting to also pass the natural science examination.

The student is ready for a division I examination when he has taken one or two courses in a school and is ready to try out his ability as a scholar or artist. After choosing the faculty members who will constitute his examining committee, the student works with them to construct the exam—that is, picking a subject to investigate, isolating the question or task, finding resources, and setting standards for evaluation.

In his division I social science examination proposal, one student wrote, "I would like to take two films that I have made, 'Bondsville' [about the effects of an industrial fire on a small Massachusetts town] and [one] on child abuse and neglect and discuss the problems the filmmaker encounters when studying a cultural scene different from his own.... I would like to include some of John Collier's ideas (from his book *Visual Anthropology*) on the responsibility of both the artist and the social scientist when confronted with the task of recording the essence of this extracultural phenomenon. There seems to be a sensibility and a relationship suggested that both the artist and the social scientist must share if there is to be a successful communication of ideas on film. I propose an exam that would confront these ideas through the viewing of the two films, a paper, and a discussion with the examiners."

A concentration—cousin to a major, though usually interdisciplinary—is planned in division II with a committee of two Hampshire faculty and another advanced student or a faculty member from Five Colleges, Inc. (a cooperative of neighboring colleges that consists of Amherst, Mt. Holyoke, Smith, and the University of Massachusetts in addition to Hampshire). Students may take one or two courses each term at another institution; the concentration may also include independent projects or field work. A contract is filed at the outset, but most are revised at least once as new curiosities materialize.

"My division II concentration will consist of courses and field work which will help me to better understand the relationship between social work and social reform and the role of each in society," reads one contract. "Field work will be coupled with courses in psychology, sociology, and political science, so that I will gain an understanding of the internal and external forces that guide and limit individual, group, and societal behavior."

Division III is devoted to an advanced independent study project that must result in a substantial paper or performance that can be evaluated. Usually the subject arises from work done in division II, with some aspect picked out for probing in greater depth. But the job may instead plumb territory previously uncharted by the student.

Examining committees for division III projects have at least three members: two Hampshire faculty and a Five Colleges professor or supervisor from a student internship. One student's work was done in conjunction with an internship at the Adirondack Park Agency. She worked with the director to write a pamphlet, which is still being used. Her committee included a professor of American studies interested in attitudes toward land forms, an environmental ethics professor, an ecologist from Amherst College, and the agency director.

It is in division III that integrative work is compulsory. The project must draw from different areas, or the student can fulfill this requirement by participating in an integrative seminar. New England: Myth Versus Reality was the topic for one. A student-led group of 20 (aided by David Roberts, associate professor of literature, and American Studies professor David Smith) contrasted the region's image—as the home of Yankee farmers who doggedly scratch a living from the stony ground and revere the principle of individual liberty—with fact: The area is 80 percent urbanized, largely industrial, and so expensive that the farmers can barely afford to work their land. The thoughts of artists, writers, environmental planners, social scientists, and others were brought into play by means of field trips, speakers, and readings. Other integrative seminars have dealt with Social Theory: Marxism and Psychoanalysis, The Human Environment (including architecture,

ecology, and anthropology), Seminar on Color (with an artist, a physicist, and a philosopher), and Law and Literature.

An activity that benefits either the Hampshire campus or the community is also required of division III students; they must assist in courses, advise other students, serve on a college committee, teach in local schools, or volunteer in public service agencies. Joining the Ad Hoc Advisory Committee on Nuclear Power in Amherst, one student worked with selectmen to prepare a report for the town. Members conducted their own research and met with representatives of Northeast Utilities and other pertinent groups.

"There's a great premium here on not emphasizing a fixed body of knowledge," notes Penina Glazer, dean of faculty. "There are some students who, while taking other things, stick pretty much with one area. And there's no reason you can't be a perfectly respected faculty member who teaches by yourself in your own discipline." Some faculty, though, are not wholly comfortable with Hampshire's interdisciplinary emphasis: "It's fair to say that we have a segment of young faculty who worry about professional development," she explains. "They feel it's sometimes not given full opportunity to blossom. Because interdisciplinary work takes a lot of time, there isn't much left for one's field."

Still, most faculty carry the interdisciplinary banner with enthusiasm; some came to Hampshire for that reason. John Boettinger, associate professor of human development, taught introductory American studies at Amherst before landing at Hampshire in 1967. "The concept of interdisciplinary education was familiar," he explains, "but it had meant a succession of disciplinarians addressing themselves in sequence to discrete issues. I came here with an interest in developing an integrated program and spent the first three years undergoing reorientation myself—from political science to psychology to human development. I was drawing on a variety of disciplinary resources in my own reeducation."

Distressed that "so many central human concerns had fallen between the chairs of the behavioral scientists," Boettinger fashioned courses such as The Coming of Age, which he teaches with David Smith and an art historian. Examining adolescence and old age and discussing the qualities these segments of the life cycle have in common, the professors work with 40 students. Sometimes the class is divided into three groups with each leading one; at other times, says Boettinger, "The three of us work together in a fishbowl-like way" before the entire group, grappling with questions scholar-to-scholar. Boettinger enjoys this because "it's hard to be with one's colleagues in circumstances that are important in a professional sense. We talk at meetings or have a quick cup of coffee, but to learn from one another and experience intellectual companionship I find a delight. This is the additional dimension of collaboration."

It's hard to be with one's colleagues in circumstances that are important in a professional sense. To learn from one another and experience intellectual companionship is a delight. This is the additional dimension of collaboration.

Raymond Coppinger majored in philosophy, minored in literature, and did graduate work in science. "People ask me why I switched around," he says, "and I tell them I really didn't—it's all part of one thought process." For team teaching Coppinger picks "colleagues I disagree with, so we can have dialogues. For instance, I taught one course with an anthropologist, and in our initial statements to the class we took a hard line. He discussed the mind as a blank slate that becomes filled with environmental influences; I espoused the biological reduction argument: Everything is predetermined. We argued all semester in front of the class, fought it out, called each other jerks. This went on for three years. The only way to stay alive is to have this kind of discourse. If we were discipline oriented we'd be little islands unto ourselves—in a small college, how many biologists are there? And of course, students have been practicing interdisciplinary studies practically since the beginning of colleges."

"One of my greatest experiences here has been watching the professionals together," says architecture student Channing Harris. "We get a clear sense of what it means to be a psychologist or an anthropologist. We're hearing educated and informed argument rather than one point of view presented unopposed."

While some students don't fare well at Hampshire, seeming to miss the identity afforded by traditional major programs, Penina Glazer reports that, on the whole, "the returns are good. There are 1,200 graduates and we're beginning to survey them now. We've had fine placements in graduate and professional schools, even though we were concerned at first that they wouldn't read the elaborate Hampshire transcripts." Glazer recounts many instances of former students, now employed, reporting back with praise for the Hampshire system; one who went for a master's at Brandeis noted that while his preparation wasn't as strong on facts as that of other students, his research skills were way ahead. "When it came to analyzing, figuring out resources, and using archives, I was on top." Another described his experience as one of three newly hired congressional aides. When the congressman announced that he needed information the next day on a certain issue, the Hampshire graduate was the only one who had no trouble coming up with it. "I hustled my way through it," the student said, "the way I hustled my way through Hampshire."

For more information: Peter Gluckler, Director of Public Relations, Hampshire College, Amherst, MA 01002, (413) 549-4600.

Tracking Civilization on Gentrain: Snapshots of Global History

"Gentrain" is what Monterey Peninsula College calls the interdisciplinary program which is gaining it widespread recognition. A semi-acronym for General Education Train of Courses, the name is simply a testament to the fact that students who complete the course will have satisfied all but two of the community college's General Education requirements. A more vivid picture of what Gentrain really entails can be found in the posters that advertise it around the college. They depict a large hand holding a small globe gingerly between thumb and forefinger: Gentrain is that hand, offering to students the world itself, reduced to the manageable proportions of a 30-week survey course.

In 1972, armed with a $30,000 planning grant from the National Endowment for the Humanities (NEH) and dedicated to "improving learning efficiency," a team of MPC faculty sat down to organize a scheme for presenting all the world's history, philosophy, and art to their students in a finite period of time. They proceeded with scientific deliberation, dividing the timeline of civilization into 16 major blocks and then portioning out the history, philosophy, language, literature, and art to the staff members trained in those specialties. Each instructor wrote up a brief discussion of his assignment: These essays, compiled into a syllabus of some 1,000 typed pages, now form the backbone of the Gentrain curriculum.

With only a few minor alterations —there are now 15 units instead of 16, and the syllabus underwent a major NEH-sponsored revision three years ago—the structure of Gentrain has remained essentially the same. It consists of 15 two-week units, from Prehistoric and Earliest Civilizations to World War II to the Present, one for each volume of the syllabus. Classes run for four hours, with a break for lunch, two days a week. Most are lectures, although not infrequently a movie, guest lecturer, or even a play will be presented during class time.

Within this structure, however, the Gentrain system offers students a uniquely flexible mode of education. They may take as many of the units as they like, receiving 1 semester unit of credit for each whether they enroll for 1 or for all 15. They may take each unit for a letter grade (necessary for transfer to the University of California system), for "credit" (sufficient for a transfer into the state college system), or for no credit, as an adult education course. And they can take the course over and over again if they like, with no risk of boredom or a feeling of déjà vu, for while the syllabus remains a constant, the lectures are continually changing.

The four instructors who run Gentrain are highly qualified educators (one in philosophy, one in art history, one in literature, and one in history and political science), but even they cannot present a detailed review of all of civilization in 30 weeks. Rather, each year they meet to determine a "theme" for each of the units they will present, a focus about which the 15 hours of class time will revolve. The syllabus for each unit, ranging from 50 to 80 pages of notably cogent prose, is distributed before the unit begins, to serve as background and bibliography for the lectures; the lectures take off where the syllabus ends.

The result is, in the words of Philip Nash, MPC's dean of instructional planning, "a series of snapshots of global history." Each year the Gentrain camera pans across the timeline of western civilization and stops to click at slightly different scenes. For both students and faculty the experience is exhilarating and all-consuming—"a celebration," Nash says, of the human condition.

The year begins with two weeks devoted to Prehistory, the early civilizations that flourished before 1200 B.C. The 80-page syllabus provides a quick glimpse of man's evolutionary journey to the Bronze Age, and then an overview of Bronze Age cultures and their religions, art, language, and literature. A bibliography at the end of each chapter steers inquisitive students to more detailed sources.

In class each instructor has three or four lectures in which to expand on particular aspects of the theme that has been chosen to bring the unit into focus. For a theme of "Man Makes Himself," for example, the philosophy instructor will talk on magic, science, and religion, and a week later on life and afterlife; the literature instructor will present a film on the alphabet, and then lecture one day on the literature of Egypt and another on the Epic of Gilgamesh. Other lectures will focus on the art of Egypt, the Aegean, and the Fertile Crescent, and the slowly evolving technology of the time. The team may conduct a group session debating the question, What is civilization? Throughout all lectures, students—as well as other instructors—are encouraged to interrupt with questions or comments.

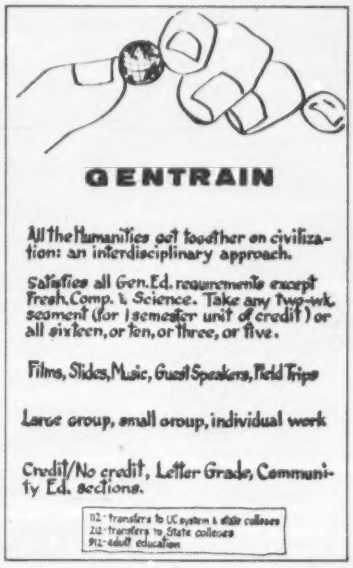
The sixteenth and last hour of the unit is devoted to testing for those students who are taking the course for a grade or for credit. Students desiring a grade are also required to submit a short essay on a given topic.

The next unit, Foundations of the Classical World, begins the following week.

Thus the team of instructors, who meet two or three weeks before the start of a given module to work out the details of their presentations, progresses apace through the civilized world. They admit that many important topics are given short shrift—the history and civilizations of the East most notable among them—but a great many more are expertly and eloquently explored. To highlight an examination of the Foundations of the Classical World with the theme "The Birth of Heroes," students explore the ramifications of the *Iliad* and the *Odyssey*, consider the Bible as literature, and view scenes from *The Trojan Women* performed by MPC's drama department. The Rise of Rome, unit IV, may be typified with the catchphrase Citizens and Individuals, and encompass lectures on public life and civic architecture, poets and storytellers, and Roman political life and law. Unit VII, the Early Renaissance, may look at Machiavelli, Leonardo da Vinci, and the *Canterbury Tales* as it attempts to answer the question "Rebirth or Transition?" The drama department may reappear in unit XIII for a selection from *Major Barbara* to illustrate "The End of Innocence, 1870-1918."

"Our major concern," says Nash, "is not to wear out our teaching team [one important reason for the continuous changing of themes]. We don't worry about the students—they're never bored." The pace of the course as it now stands is apparently satisfactory for both: At a rate which varies from several millennia to 30 years every two weeks, it is rapid enough to keep the students invigorated, yet not too rapid for the faculty to remember what century they're in. Telescoping time to such an extent, as well as emphasizing the chosen theme as a common thread through each unit's material, has also proven invaluable for bringing out the interdisciplinary aspects of the material.

The faculty must constantly bear in mind, however, that the enrollment of the course will never be the same from unit to unit. Prerequisites for individual units, therefore, as well as grandiose mid-year or end-of-year summings-up, are out of the question. Integration of the disciplines across time, as well as across subject lines, can never really be achieved. Usually, of the hundred or more students enrolled in the course, 55 percent stay on through the year, while the other 45 percent come and go. Some loyal souls stay on year after year, however, riding the Gentrain to the end of the line for the sheer pleasure of the trip.


GENTRAIN
All the Humanities get together on civilization: an interdisciplinary approach.
Satisfies all Gen.Ed. requirements except Fresh.Comp. & Science. Take any Two-wk. segment (for 1 semester unit of credit) or all sixteen, or ten, or three, or five.
Films, Slides, Music, Guest Speakers, Field Trips
Large group, small group, individual work
Credit/No credit, Letter Grade, Community Ed. sections.
112- transfers to UC system & state colleges
212- transfers to State colleges
912- adult education

The course is unusual among community college offerings in the enormous appeal it has for what Nash terms the college's "new populations"—senior citizens, women returning to school for their long-postponed degrees, veterans, and the handicapped. Perhaps because of the flexible scheduling, students enrolled in Gentrain are much older than the standard college population, usually having a median age of 55 or more. Of them, many are likely to have master's degrees, and a considerable number appear every year with PhDs. "It's a meeting of the intelligentsia," Nash says. "They know quality when they see it." His aim now is to entice more 18- to 22-year-olds into the course, if for no other reason than "to get at some of that accumulated wisdom" the older members have.

The course is eliciting unquestionably sincere compliments from within the college as well as from the outside world. Students, faculty, and the endless procession of outside consultants who have come to Monterey to scrutinize Gentrain have all submitted evaluations couched in glowing terms. The program has won unsolicited letters of commendation from community leaders who have participated in it, and also kudos at several regional NEH conferences. Nash estimates that barely a month goes by without visitors from other educational institutions coming to Monterey to see the spectacle for themselves. Within the college, "more people than we can possibly use want to be a part of it."

The expiration of the NEH grant in June of this year saw Gentrain firmly entrenched at MPC, an interdisciplinary program with all the earmarks of an unqualified success. Nash is now envisioning expanding its service: He would like to recreate the course as a teleseries which, via public or cable television, could reach a student body far removed from the usual community college clientele. He is convinced that Gentrain, unique for its ambition and enthusiasm in "a weary age," will never lack for passengers.

For more information: Philip C. Nash, Dean of Instructional Planning, Monterey Peninsula College, 980 Fremont, Monterey, CA 93940, (408) 649-1150.

A Humanistic Perspective on the Professions

"Medicine is my lawful wife and literature my mistress," wrote Anton Chekhov. "When I grow weary of one I spend the night with the other." Few professionals today can boast of a relationship with the humanities as intimate as this. Rather, as professional training engulfs students at progressively earlier stages in their education, the professions and the humanities are quickly becoming hostile camps, mutually exclusive domains of competence inhabited by mutually antagonistic experts.

On most American college campuses tens of thousands of students march through their undergraduate years with barely a nod in the direction of the humanities. Some are scientists and the rest preprofessionals, students who chart an undergraduate course carefully designed to land them in the business, law, or medical school of their choice. To these embodiments of the "new vocationalism" the humanities are, at worst, a necessary evil in the form of a distribution requirement, or, at best, a luxury for which there is no time.

On the University of Florida's bustling Gainesville campus a small group of humanists and professionals has spent the last five years methodically bridging the chasms between their respective fields. The program they have devised, Humanities Perspectives on the Professions (HPP), is not only an effort to infuse undergraduate humanities teaching with the much-sought palatability for a career-oriented student body. Its concomitant aim is to inculcate preprofessional students with the values and attitudes that only a study of the humanities can bring.

This dual purpose, which distinguishes Florida's program from most of the country's other ventures in applied humanities, can be traced back to the program's inception in the early 1970s. Surprisingly, it was the brainchild not of the university's humanities departments but of faculty members at the University of Florida Medical School, who were becoming increasingly disturbed at the quality of education of their first-year students from all over the country.

"They were, simply, dissatisfied with the product they were getting from the colleges," says Ronald Carson, a professor of social science at the medical school who is also acting director of the university's Center for Studies in the Humanities and HPP's chief administrator. "They needed better material—students who thought better, who wrote better, all things that a graduate school just didn't have the time or the resources to do anything about." The doctors' plaint met with a sympathetic and receptive audience at the Center for Studies in the Humanities, and a cooperative venture aimed at undergraduate premedical students began (see "Keeping Professionals Human," *Change*, February 1977).

Now entering its fourth year of operation, the program has grown to include faculty members from the university's law, business, and engineering schools as well, thus diversifying its appeal among the entire preprofessional student body. A basic grant of $600,000 from the National Endowment for the Humanities has been augmented by private funds and the university itself to a total projected investment of some $2.7 million. Operating with the full financial and moral support of the university, a combined staff of humanists and professionals has been able to devise a syllabus of more than a dozen interdisciplinary courses.

The courses are all senior-level electives, team taught by an instructor in the humanities and a faculty member from a professional school. In each field, a core course (Humanities in the Health Center, Humanistic Issues in Engineering) introduces up to 25 students to a spectrum of humanistic considerations that they are not likely to have encountered in any of their professional training. Subsequent topics courses (Ethics and Medicine, The City in Historical Perspective, The Courtroom as Theater) cover more specialized topics for students whose interest has been snared. Topics courses are limited to 15 students and usually involve only one of the humanities rather than the mélange that makes up the core courses. All told, each semester students can pick from four or five courses in each of the professional fields.

The prototypes for the courses were the program's first experiments with medicine-related issues. These pioneering ventures have broadened in scope to include the university's other three health-care fields—nursing, pharmacy, and health-related professions—and now constitute the program's most diversified and popular offerings. The core course, Humanities and Medicine, is taught by director Carson, who describes it as "a quick dip into a number of issues, just enough to get them thinking."

At the first session students read Hawthorne's short story "The Birthmark," a virulent attack on doctors and science, which paves the way for a discussion of the historical roots of skepticism and hostility to medicine. Subsequent classes focus on studying and practicing medicine, hospitalization, and death; readings include selections from William Carlos Williams and Thomas Szasz along with Susan Sontag's recent *Illness as Metaphor* and Kafka's *Metamorphosis*. They all offer a perspective on the profession that most premedical students have never had the time nor the inclination to consider. Should the student choose to expand his horizons still further, topics courses such as Philosophy and Counseling, The Literature of Science, and Human Sex Roles in Cross-Cultural Perspectives are available for an in-depth survey of the wisdom each separate humanistic discipline has to impart to the budding doctor.

Carson reports that the students who enroll for his courses usually have certain characteristics: "They're self-motivated, they're looking around. They're off familiar turf in this course. They're not used to reading or to writing papers, and a fall in their average can have disastrous results. They're taking a risk. They say to me, 'What good will this course do me? What's the payoff?' I feel they

deserve a response."

His response is that nowhere else will students be able to pick up the lessons the humanities have to teach them, and his students seem more than satisfied with this reward. Word of the courses has spread throughout the university's premed underground. Premedical advisers recommend them to their charges, and the courses are invariably booked to capacity. Only rarely will a non-premedical student venture to enroll. Carson finds that the preprofessionals bring to his classroom a kind of aggressive intellectual curiosity alien to most traditional humanistic training and have in fact "scared away" some non-premeds. "Premeds have intimidated some very promising philosophers," he says.

Unlike the premedical offerings, HPP's prelaw, prebusiness, and preengineering sequences have not been without their occasional problems. Law schools have less stringent entrance requirements than medical schools, and law is a career sink for many humanities majors—hence such courses as Art, the Intellectual, and Law and Philosophy of Law, aimed at a largely undefined audience, have had adequate, but not spectacular, enrollments. Prebusiness students are a similarly diffuse group, and HPP's business option, only two years old, often has unfilled classes. Human Images in Economic Thought, however, which attempts to look at business "with its pervasive yet often indefinable influence on our culture" from the human standpoint, has become a notably popular choice.

The engineering courses have encountered the opposite difficulty. An undergraduate engineering degree necessitates such a tightly structured program of required courses that the students have little time in which to explore electives. Carson has tried to ease the situation by having such courses as The Atomic Age, in which students consider the genesis of the bomb from the perspectives of history and political science, cross-registered under Engineering, Nuclear Engineering, and History. The engineering options have still been noticeably slower than the medical to catch on, a trend well summarized by one student's rueful explanation of why he really hadn't enjoyed reading Leonardo da Vinci's journals: "I guess that's why I'm an engineering major."

Nonetheless, the evaluation built into the HPP program reiterates every year, "Student enthusiasm continues unabated." Faculty response has been equally positive, particularly, Carson notes, among instructors whose personal educational goals have been stifled by standard university teaching duties. The HPP program offers them a flexibility they find nowhere else on campus, and they respond with a deep commitment to the program and its future.

The aim of Humanities Perspectives on the Professions is to inculcate preprofessional students with the values and attitudes that only a study of the humanities can bring.

Acknowledging that the program may well have as great an impact on faculty as it does on the students, its administrators have taken a step toward formalizing this trend. In 1977 a grant from the Lilly Post-Doctoral Teaching Awards Program enabled the university to import five new PhDs to take part in the program for a year as a natural transition between graduate school and teaching careers. For half the year they observed the program in action; in the remaining half they taught an HPP course that they had developed themselves. As an effort to implant "a new sense of freshness and urgency" among humanists at a time when a general lack of self-esteem is endemic to the field, the success of this experiment has been enormous, and it will be expanded next year. In the process, although Carson denies any missionary intent, the HPP program is achieving a national following.

The question of the effect the program has had on the futures of students is more delicate: Neither the extensive in-college evaluation nor the repeated NEH site visits can ascertain if, in fact, the program has accomplished its primary goal of affording the humanities "a greater impact not only on all preprofessional education...but also on national direction, values, issues of heritage, and perspective of humans involved in the professions." Although he cannot quantify his results, Carson indicates that his own experience as a professor in the medical school gives him reason to believe that its long-term effects are considerable.

As the instructor in the first-year curriculum in which social and ethical problems in medical practice are considered, Carson sees a sizable number of ex-Florida undergraduates, many of whom have been through the HPP offerings. Comparing their reactions to the range of ethical problems posed by his course with the reactions of their peers, he has noticed a significant difference between them, which he describes simply as "a broader cast of mind. The ex-HPP students can deal with more variables for a longer period of time; they're not as anxious for resolution as the rest of the class."

He interprets his observation as part of the lasting effect an exposure to the humanities has had on these students. "They are not resourceless in facing these difficult issues—they don't panic, and they don't immediately leap to the solution that is medically indicated. They know that there are historical precedents for what they are going through." His students have acquired, he believes, a bit of the humanist's habit of contemplation, which will serve them well as they progress through their education. And similarly, they have imparted to the humanists they have come into contact with a bit of their own sense of urgency, immediacy, and action—certainly a transaction that can only bode well for the future of the humanities in the professional world.

For more information: Ronald A. Carson, Acting Director, Center for Studies in the Humanities, 186 Grinter Hall, University of Florida, Gainesville, FL 32611, (904) 392-4997.

Law and Justice Studies: Built on a Firm Foundation

On a peninsula that snakes into Boston Harbor sits the city campus of the University of Massachusetts; near its tip, situated so that the building seems to be surrounded by water, is the College of Arts and Sciences. Its major contribution to interdisciplinary education is a law and justice concentration—a directed course of study within a major—that integrates the humanities with study of the law and legal institutions and their roles in society. Designed not for preprofessional students, it is geared instead to the 90 percent of concentrators who have no intention of going on to law school. The program is built around two questions: What human ideals operate in law? and, How effective are legal institutions and practices in realizing these ideals?

The 23 credits required of the 230 concentrators are earned in three stages. First comes one of two introductory courses: an eight-credit Foundation course (only four credits count toward the concentration; so much writing is done that the other four satisfy the freshman composition requirement) or a four-credit course, Introduction to Law and Justice, that is essentially the same but minus the writing component.

The backbone of the program, the Foundation course was first offered in 1973 with the support of the National Endowment for the Humanities (NEH). It is team taught; last spring's course, for example, was led by professors of history, philosophy, classics and education, and English. The gaps between law and justice are explored, supplemented with literary, historical, political, philosophical, and sociological materials. Class structure varies; lectures and discussions are interspersed with debates, panels, field trips, films, tapes, and guest speakers.

"We try to give a broad perspective on what the law means," says English professor Francis Russell Hart. "This morning we were teaching an African novel, *Things Fall Apart*, to illustrate alternatives. The point was the ways in which societies have handled the problem of social control. We do it with a system of laws, but we try to see how another culture differs."

Larry Foster, philosophy professor and director of the program in law and justice studies, explains that "we use techniques like debates, panels, and role-playing to fight that tendency to stick to our areas of expertise. It's so easy to fall into the usual team-teaching routine, dividing up lectures according to our disciplines." Foster describes an exercise centered on "The Case of the Speluncean Explorers," a story of five men trapped in a cave by a landslide. They toss dice to determine which one will be sustenance for the other four; after rescue there is the question of whether the survivors are guilty of a crime. Faculty play the parts of five Supreme Court justices, each espousing a different view; after rebuttals they open the discussion to the class. "Because I played the same justice every time," Foster grins, "I became convinced that his view was the only correct one. So I started to switch off and take other positions, which now seem more sensible."

Efforts to avoid assuming conventional roles have characterized the course since its birth. Foundation course faculty frequently swap hats: The sociologist guides discussion of the filmed folklore of crime, the philosopher helps students interpret *Billy Budd*, the historian lectures on Plato or Hobbes, and the English teacher analyzes lawmaking.

"This has worked out better than we anticipated," Robert Swartz, head of the philosophy department, reports. "The degree of technical expertise you need in your discipline to teach well at the freshman level is not very great. That I wasn't trained in sociology doesn't mean I can't present sociological material. And it's good modeling for the students; we can get it across to them that they can plug into disciplinary material without having to go through a whole or even a large part of a major in that discipline."

Another unconventional aspect of the Foundation course is that the patchwork faculty team handles the fundamental skills that are too often the lonely province of individual departments: reading comprehension, interpretation, analytic reasoning, critical judgment, argument, and expository writing. "The freshman part of the program is still the most important to me," Rus Hart declares. "It has the objective not of introducing students to law and justice, but of introducing them to college study in an interdisciplinary way."

At least nine credits are earned in the next stage of the program, which consists of three-credit courses in three core areas: Sources, Limits, and Functions of Law; Legal Institutions and Procedures; and Forms of Social Justice and Social Ethics. These are also taught by teams. Last spring Larry Foster and law professor Sy Moskowitz taught Courts and Society; students learned about the adversary system, due process, the judge's role as bureaucrat and administrator, the uses and abuses of judicial discretion (particularly in sentencing), and judicial responsibility. Alternatives to the American system —revolutionary courts in Cuba and peasant courts in a Mexican village— were also studied. Assigned readings drew from anthropology, philosophy, political science, and sociology.

Philosophy professor Howard Cohen and psychology professor Don Mixon taught Obedience and Resistance, which explored reactions to legitimate authority. Stanley Milgram's book *Obedience to Authority*, along with a film, illustrated the experimenter/subject relationship, and the class examined Milgram's research strategy on both methodological and moral grounds. Works including Lillian Hellman's *Scoundrel Time* highlighted a look at the congressional committee/witness relationship; responses of witnesses to the House Un-American Activities Committee, particularly in the Hollywood investigation, were studied. Lieutenant Calley and the My Lai case exemplified the superior

officer/subordinate relationship.

The third core course, Moral and Legal Reasoning, was taught by Robert Swartz and law professor Brad Honoroff. Abortion, reverse discrimination, conscientious objection, and euthanasia were analyzed, along with the question of whether there are moral constraints on lawmaking, enforcement, and obedience. Concentrator Pat Oliva, an anthropology major looking toward a career in legal anthropology, found this course particularly helpful: "The process of enculturation of the law is of great interest to me," she notes. "There's more to the law than what a lawyer does."

What a lawyer does, however, is no esoteric secret to law and justice concentrators; each year the program sponsors a lawyer-in-residence who not only advises preprofessional students and participates in career seminars, but also teaches a law and justice course and sometimes oversees field work. Efforts are made to bring in a lawyer with a different specialty each year, and some stay on as faculty after the residency expires. Visiting lecturer Edward Stern, who was lawyer-in-residence for 1976-77, explains, "My predecessor taught consumer and welfare law, I taught criminal and juvenile law, and the current resident teaches the law of developing nations and human rights."

Each concentrator takes a four-week minicourse in program planning. "Given the interdisciplinary nature of the concentration," says Clyde Evans, assistant professor of philosophy, "we felt it was important for students to sit down with a faculty member before they've taken three years of courses and build some sort of coherent scheme to connect their law and justice work with their major." This is the only minicourse that is required. Others are single-credit electives (maximum: seven), relevant flights of fancy "from some legal corner of a professor's mind," as political science professor Jack Spence puts it. Mostly they cover the sort of material that years ago was only discussed when teachers allowed themselves a tangent. Students may opt for Evans's Behavior Modification, which looks at the legal, philosophical, and moral implications of the use of psychological techniques like operant conditioning in prisons and hospitals; or assistant professor of sociology Janet Kohen's Single Parents and the Law, on custody, alimony, and welfare.

Faculty frequently swap hats: The sociologist guides discussion of the filmed folklore of crime, the philosopher helps interpret *Billy Budd*, the historian lectures on Plato or Hobbes, and the English teacher analyzes lawmaking.

A three-credit senior seminar completes the program. A specific law and justice topic is examined and students do a 15- to 20-page paper. Last fall's class, after studying John Rawls's *A Theory of Justice*, was asked to write "a concept of justice, and of law as its handmaiden/mistress/betrayer." In their papers students were urged to "range freely over courses you have taken in the law and justice program, over courses in your major, over related experiences that have nothing to do with courses."

A lengthy evaluation of the Foundation course was made in 1974. Although formal evaluations are no longer done, the results of the original study were sufficient to convince NEH to continue supporting the program, and the university has committed itself to full funding after the grant ends this summer. But it hasn't been clear sailing by any means; difficulties have plagued the program all along.

"We don't have a separate law and justice faculty," Robert Swartz explains, "so we have to get commitments of teaching time from departments. We wrote this into the second grant, and NEH has taken it as a binding commitment from departments. But it's turned out to be complicated. Where departments were initially delighted to participate, those now facing cutbacks use the commitment to law and justice by threatening to pull out of it if they lose faculty. In some cases, we've become a political football between departments and the dean.

"The way we have organized the resources for the program has many advantages. It brings us faculty of high quality who are in the mainstream of their disciplinary and departmental work, and it opens up lines of communication between faculty who can learn much from each other. But it forces the program to be constantly on its guard to make sure that departments sustain their commitments. Our hope is that with a strong dean who openly supports the program, these pressures from outside will not arise.

"But now there's an even more serious problem. We went out of our way to get a good mix of junior and senior faculty; the dean at that time gave departments resources to hire people for the program. They came in on the ground floor and were funded by grants to develop new courses, with a promise from the dean that they would get credit for it. But this has changed now. Junior faculty are not getting tenure, and that's creating a problem of morale among the junior faculty. My prediction is that unless we can change this we can't attract junior faculty to law and justice, and the senior faculty can't carry it alone.

"It's a fantastic program. The students love it, the faculty loves teaching in it. But without strong administrative support it will be extremely difficult to sustain the innovations and excitement in the program that we've developed and experienced during the past five years."

For more information: Robert Swartz, Chairperson, Philosophy Department, University of Massachusetts at Boston, Harbor Campus, Boston, MA 02125, (617) 287-1900.

A Program for Integrative Education: Satisfying the Search for Unity

Most educators will agree that the hardest intellectual task a student faces during his college years is not mastering the details of each discipline he encounters but integrating the fine points into a coherent whole. It is the rare college curriculum that offers students any help with the job of organization and synthesis; it is the rare student who successfully tackles the chore alone.

In 1972, a group of educators at Earlham College, a small liberal arts school in Richmond, Indiana, realized that the task of integrating the elements of an undergraduate education was one which they themselves would find difficult. They decided to share the responsibility of confronting it more equally with their students. The result, Earlham's Program for Integrative Education (PIE), has been not so much an innovation in undergraduate education as a simple extension of its domain, an expansion onto turf where college curricula very seldom venture.

Funded by a grant from the National Endowment for the Humanities and supplemented with private gifts, PIE was intended to replace introductory survey courses with a more comprehensive approach to the same material. It was described to students as "a way to find the unity in your education while you satisfy distribution requirements." Although the courses were open to the entire student body, they were especially recommended for sophomores. During its first two years of operation, such offerings as Women and Men: Sexual Identification and Roles in Society enabled students to fulfill distribution requirements in the natural sciences, social sciences, and English literature while they explored the problem of sexual identity from different points of view. The more ambitious Personal Identity, Freedom, and Social Role brought together faculty from six departments to study the privileges and responsibilities of the individual as a member of a family, a class, a state, a species, and a religion.

Subsequent PIE courses have synthesized philosophy and astronomy into a study of cosmology and the overlap between myth, religion, and science; and they have probed the economics of ecology with a simultaneous consideration of the economics, biology, and history of man's natural resources. In Mind, Expression, and Faith in the Ages of Classicism a staff with backgrounds in history, art history, philosophy, religion, and literature came together to compare the civilization of fifth-century Greece with that of the Renaissance. Contemporary Japan immersed students in Japanese culture, politics, and national heritage and explored the worldwide significance of that nation's new-found economic might.

But the course that constituted PIE's most ambitious venture and came to be known on campus as "the PIE course" did not emerge until PIE's third year. It had its genesis in a memo that professor of chemistry Gerald Bakker sent to three of his colleagues in the philosophy, history, and physics departments suggesting that they collaborate on an integration of their four disciplines. However, Discovery and Interpretation: the History and Philosophy of Chemistry and Physics was not to be a standard course in the history of science. While most conglomerates of history and science either neglect scientific details completely or content themselves with a "physics-for-poets" approach, Bakker's course would provide a rigorous mathematical treatment of introductory chemistry and physics that would enable students to continue on in intermediate courses in either department.

Discovery and Interpretation blossomed into a two-semester, four-credit course, meeting 10 hours a week and occupying nearly one half of a student's time for one academic year. Half lecture and half seminar, it presented an unusual challenge to the four faculty members in charge. The chemistry and physics components had to be lifted virtually intact from traditional first-year courses so that students would have the vocabulary and background for further work. The history and philosophy components had to be carefully selected so as not to obscure the science. The danger was that the result would be four minicourses rather than an interdisciplinary synthesis.

The faculty met the challenge in two ways. The first was in their deliberately communal administration of the course. They worked over the course material together incessantly; usually all four were present for class sessions, regardless of who was lecturing or chairing the discussion. Although tests were designed by different instructors, students' overall grades were jointly determined. Each faculty member made a point of closely scrutinizing the materials of the other three, a practice that occasionally resulted in lively classroom disagreement, to the students' glee.

The primary technique for insuring that the course became more than the sum of its parts, however, was the handling of its historical and philosophical content—in Bakker's phrase, "the glue that held the course together." If the scientific parts of the course were exceptionally rigorous, the historical component was equally so. Students were required to read and participate in discussions on selections from both history's great scientists and science's great historians, from Aristotle, Ptolemy, and Archimedes to Galileo, Brahe, Copernicus, Newton, and Kuhn. Four essays—on the astronomical revolution, Newton, heat theories, and Kuhn—were required. At least once during the year, each student was required to make copies of his essay for the rest of the class so that it might serve as the focus for discussion.

The historical component became a framework for the synthesis and understanding of the scientific concepts progressively unveiled during the year. An assignment in Newton's *Philosophy of Nature* preceded a class discussion of force, mass, and inertia; students came to their first

consideration of the nature of chemical bonding with selections from Lavoisier's observations fresh in their minds. Working with a historian gave them insights not only into the interrelationships of the concepts that together constitute modern-day science, but also into the cultural context of science through the ages.

The philosophical component of the course was equally significant in explaining and integrating the science. Most of the readings were taken from *Concept of Explanation*, a text assembled by Bakker and the course's philosophy professor, Len Clark. Utilizing readings from philosophers as diverse as Aristotle, Bacon, Hempel, James, and Popper, their presentation aimed to provide a basic understanding of the various themes in scientific theory. Class sessions explored the religious and ethical ramifications of science, paying close attention to the philosophies propounded by the sciences themselves. At the end of the year, each student produced a paper defending his own theory of scientific explanation.

Within these conceptual guidelines the students progressed through two standard introductory courses in physics and chemistry, complete with problem sets, lectures, and weekly labs. No effort was made to integrate the physics and the chemistry, and the laboratories, except for one session duplicating Galileo's work with inclined planes, were typical first-year exercises, not reproductions of significant historical experiments. Throughout the year, however, students were not allowed to forget the context of the science they were learning: Readings, essays, and the remarks of their history and philosophy instructors provided constant reminders.

The PIE course, which drew its enrollment primarily from Earlham's freshmen and netted about equal numbers of science and humanities majors, was extraordinarily demanding. Although students who finished it consistently gave it excellent reviews, its enrollment steadily dropped, from 40 in its first year to 30 and then to 13. A combination of factors conspired against it. Vigilant freshman advisors warned their

B.C. Carter

The Japanese section of Earlham's library is an ideal study spot for students in Contemporary Japan.

charges that it might be too difficult to constitute a good introduction to college life, so freshmen who wanted to specialize in science were influenced to take their basic science elsewhere. New distribution requirements for freshmen made devoting half their academic year to one course a decision of dubious wisdom. Finally, the course was considered economically viable only with a minimum enrollment of 43.

In the face of these problems, the college decided this year to temporarily remove the course from its curriculum. It was a particularly painful move, the course's founders believe, because of the paradoxically widespread enthusiasm the course continued to evoke throughout the college, even in its last year. "Student perception of its success was very pleasing," Bakker comments. "We can't get people to say bad things about it. Both the teaching and the curriculum received very positive evaluations—but it was just too much."

"Courses of this type at other universities tend to be watered down—they use low-level math and are rarely for science majors; on the philosophical front they usually confine themselves to questions of public policy. We were doing calculus physics and considering the results of epistemological and ontological presuppositions. I don't know of any interdisciplinary effort as substantial as ours that has succeeded."

Bakker and his colleagues are convinced, however, that theirs is a workable program and, slightly altered, will flourish as a unique introduction to college science. Proposed changes include cutting the program back to three disciplines to relieve scheduling problems for both students and faculty and somewhat lessen the demands on the students. With adequate enrollments the course would come to be a financially viable proposition even without the NEH grant, which expired two years ago.

Working in the course's favor is the fact that Earlham has repeatedly shown itself to be seriously interested in the creation and maintenance of new curricular offerings, regardless of whether they are financially justifiable. Athough "the PIE course" has for the time being dropped out of the picture, other PIE courses continue to flourish, among them Contemporary Japan. In addition, PIE has already had offshoots in the forms of a sequence of freshman humanities courses that can replace history and literature courses and in a series of excursions into women's studies. Another offshoot, Human Development and Social Relations, is an interdisciplinary major in psychology and sociology. Just as its founders hoped, the program is proving to be not a revolution in undergraduate education so much as a natural evolution to a new theoretical grounding.

For more information: Gerald R. Bakker, Department of Chemistry, Earlham College, Richmond, IN 47374, (317) 962-6561.

Rachel Carson College: A Breath of Fresh Air for Environmentalists

"I think of myself as the mother of Rachel Carson College," says Beverly Paigen, chairperson of the RCC board of fellows and the college's first master. In 1970, while teaching genetics at the State University of New York at Buffalo, Paigen was one of a group of faculty and students who organized an Earth Day program. "It aroused such intense interest at the university, we felt we should make environmental studies available. The project started on an interdisciplinary basis because of the nature of the subject—and in the original group we were all from different disciplines. Nobody was an environmentalist at that time. We began RCC in order to teach basic information about the environment in as holistic a manner as we could."

RCC, one of 11 colleges of SUNY Buffalo, does not offer degrees; the dozen or so of each semester's 250 students who major in environmental studies receive their degrees from the faculty of social sciences and administration. The rest of RCC's students are majoring in the natural and social sciences, English, philosophy, art, geography, nursing, political science, and other fields. Fusing students of these diverse disciplines into a like-minded group is their appreciation of and concern for the environment.

Introductory, intermediate, and advanced interdisciplinary courses on environmentally related topics form the RCC curriculum. Many are cross-listed with academic departments and can be used to satisfy distribution requirements. Those not cross-listed count toward the electives necessary for graduation. RCC has no staff of its own, and faculty are plucked from just about every corner of the SUNY Buffalo campuses, as well as from the community. Practicing professionals, such as lawyers, are hired to teach appropriate courses. The curriculum is controlled by an RCC faculty/student committee and by the college's faculty curriculum committee.

"We pride ourselves on offering broad-based courses that touch on a variety of fields," says Peter Gold, RCC's intense, amiable acting master. "Departmental courses are very narrowing. They pick a single subject and examine it in great detail. In an RCC course, or a cross-listed one, we explore the material from many different angles. For instance, there are radiation biology courses elsewhere on campus, but the kids don't get the social perspective or the health aspects. Our energy courses help them see radioactivity in a totally different way." Energy, Power, and the Environment, for one, deals with the flow of energy in the environment and in society, power plant operation, thermodynamic principles in the conversion of energy into usable power, supply and demand, nuclear plant waste, current research in the development of new generators, effects of power production on environment quality, and the shaping of future energy policies.

Another RCC course, The Nutrition Battle, is cross-listed with nursing. "There's a great temptation to teach it for nurses because so many of them are enrolled," Gold says, "but we chose not to respond to that pressure." Accordingly, after presenting basic facts about vitamins, proteins, carbohydrates, and digestion, the course explores public and scientific attitudes on vegetarianism, vitamin supplements, cholesterol, food additives, and organic foods, and examines student eating habits.

Other cross-listed courses include Mathematical Ecology, Geography of Environmental Issues, Aquatic Ecology, Architecture and Environmental Design History and Concepts, Politics of Recycling, and Geology of National Parks. There are also one-credit outdoor skills courses. Backpacking and camping, canoeing, bicycling, rock climbing, and sailing are taught weekday afternoons, with some Saturday and weekend trips.

A unique feature of SUNY Buffalo's colleges is that seven offer residential programs. Blocks of space in multilevel, pueblo-like brick dormitories are assigned to each college on the theory that housing students with common interests facilitates the formation of strong, lasting friendships. To become a residential "member," a student need not enroll in any set number of courses at that college; members are chosen according to the degree of their participation in the field the college represents. Thus RCC members must show a significant environmental interest and involvement in out-of-class activities.

Students' extracurricular projects reflect a strong sense of community and a desire to bring about improvement. The RCC group has worked on campus recycling depots, garden plots, a food co-op, monitoring of Erie County's air and water quality, and studies of the physics, economics, and politics of reprocessing radioactive waste. They also take turns preparing regular Sunday suppers for the college; vegetarian dishes are always included and members are encouraged to bring friends.

"In a large, alienating environment," says Irving Spitzberg, Jr., dean of the colleges, "it's important to find personal space where people with similar interests can get together and create a community. RCC represents the paradigm of the colleges. There's a community connection, and students really view themselves in terms of their identity with RCC. It's the perfect learning atmosphere for undergraduates—and, indeed, for all of us."

RCC students are referred to faculty in appropriate disciplines for guidance on environmental questions that arise. For instance, the engineering department advised students who were dubious about the feasibility of an Army Corps of Engineers' proposal for correcting the tendency of a local stream to flood. Many RCC instructors are active environmentalists, including the curators of plants

Ellicott complex, above, combines office, residential, and classroom space; Peter Gold, acting master of RCC, with a bust of the college's namesake; the RCC logo.

and vertebrates at the Museum of Science, a nuclear energy expert, and scientists at Roswell Park cancer research center.

Spitzberg doesn't like the term interdisciplinary. "I prefer multidisciplinary," the dapper, bearded dean explains. "The idea is for people from each discipline to learn to communicate with each other, and then draw on their individual bags of tricks to address problems—not weaving all the different approaches into one grand scheme, but examining alternate approaches. In some interdisciplinary subjects like biochemistry or physics the development of strategies is very self-consciously worked out. At RCC it's knowing when to look to discipline X or discipline Y. No student will become expert in four or five different disciplines. He'll always approach a problem from the perspective of his home discipline. He hears an instructor say, 'I'm a biologist, but I'll also get an environmental lawyer to chat with you.' This kind of learning goes on in the best sort of multidisciplinary courses. One has a sense of unity but a respect for diversity."

RCC and other interdisciplinary ventures at SUNY Buffalo have had their share of difficulties. "Interdisciplinary isn't even a department," laments Lester Milbrath, political science professor and director of the Environmental Studies Center, a graduate facility. "When kids search the catalog they look according to departments, and in the university-wide description of courses the interdisciplinary majors are buried. Also, in any university, most of the faculty allegiance is to a department. They have to consider points toward tenure or a promotion. When you recruit people for an interdisciplinary program you're asking them for a contribution in a sense—you depend on their goodwill. And sooner or later you run out of goodwill. Next fall we're planning a graduate seminar in environmental studies that involves two biologists, a geographer, a geologist, and a biophysicist—and they're all working on overload."

Adds Lee Dryden, acting master of SUNY's College H (Health Studies and Human Services), "RCC enables

undergraduates to perceive interconnections among traditional majors, something that generally doesn't happen until graduate school. From the faculty viewpoint, I think it's exciting to interact with people you might never otherwise talk to. I'm a philosopher by training, rubbing up against health science people, both of us threatened by the radical differences in our backgrounds. But after that initial excitement wears off, an interdisciplinary program can suffer. You often have programs that glow like lighted matches but don't burn for very long."

RCC has also been troubled by rigidity in some quarters of the university. The recreation department will not cross-list RCC's outdoor skills courses, "so we offer them, but they don't count for gym credit," says Peter Gold. "The recreation people complain that they don't know the quality of the instructors. We tell them, 'Well, you hire the instructors.' But it doesn't work. They seem to be threatened in some way, but I sure don't know why." And a complaint about the structured nature of the engineering department comes from Chuck Ferrara, a junior in biomedical engineering. All his environmental work must be extracurricular because the department won't recognize his RCC courses.

How has RCC managed to hold its own, particularly on a budget of only $37,000? "We are recognized as being an important college," Gold says. "We more than pay our way; we cover for other colleges. For less than the pay of one full professor the university gets 2,000 student credit hours—so we're actually a bargain. Also, we don't threaten the autonomy of departments; we stay small and don't offer degrees. That way we can continue to do something very special because departments are not doing it and have no intention of doing it; some people want to, but it's not feasible in a university setting."

Part of the specialness of RCC is its integration of the contributing disciplines. "I'm always talking to students and faculty in other departments to keep abreast of what's going on there," Gold says. "I sit out front, I'm always accessible, and I try to create a climate of wanting to work with other people to maintain a strong academic program. We try and tell other departments what we're doing so they'll want to work with us as well. It's important to integrate ourselves into the academic environment of the university."

> The idea is for people from each discipline to learn to communicate with each other, and then draw on their individual bags of tricks to address problems.... This kind of learning goes on in the best multidisciplinary courses. One has a sense of unity but a respect for diversity.

Gold's open-door policy is no mere metaphor. His office and its surrounding rooms are a behive of environmental activity: Murals are being painted, newsletters proofed, demonstrations loudly planned. Outdoors he can't walk 20 feet without being waylaid by a student or colleague.

Gold is particularly vigilant about maintaining the interdisciplinary aspect of individual courses. He describes an instance where RCC's environmental politics course, which is cross-listed with political science, was being taught by a professor "who knew politics backwards and forwards, but didn't include enough emphasis on environmental issues. The following semester I explained to the graduate student who came in to teach the course that students had been complaining that it was too easy, and that I wanted it to become more sophisticated in the environmental sense. It was done."

Another of Gold's pet concerns is to help students focus their learning on a goal. "Students who come from a straight classroom major can't say what they want to do. They're too academically oriented. All of us at RCC—faculty and students—are task oriented. We build on the skills we have. We try to keep students thinking along the lines of, 'How do I use what I've learned to accomplish what I'd like?' rather than, 'What do I do with my degree?' "

To the dismay of several faculty, there is no procedure for keeping tabs on graduates, so the long-term results of an RCC education cannot be evaluated. But there are indications that the program is a success. Gold reports that the mixture of disciplines with environmental emphasis seems to have helped many students get into top graduate schools, and students themselves laud RCC for its breadth of opportunity: "A political science degree would have narrowed me down," says Denise Zasowski, a doctoral candidate at the university's center for policy studies and a very active RCC member. "It's very impractical to keep a student in a single discipline—you need a mixture." Notes Steve Walti, a geology and geography major, "RCC offers the chance to do outside projects, like testing water quality. Other science colleges don't have much room for this." And Reed Kellner, who is majoring in environmental design and planning at the School of Architecture and Environmental Design, praises the use of professionals as instructors: "When you learn environmental law from a lawyer, you really find out what's going on."

Student evaluations of RCC provide the confirming statistics: "We're pleased and surprised to find that 70 to 90 percent rate our academic program very positively," Gold notes. "So I can tell entering students that the chances are 8 to 1 they'll like what they find."

For more information: Peter Gold, Acting Master, Rachel Carson College, State University of New York at Buffalo, Buffalo, NY 14261, (716) 636-2319.

AN EVALUATION OF CHANGE'S NATIONAL TEACHING PROJECT

J. Bruce Francis
Faculty of Educational Studies
Department of Higher Education
State University of New York at Buffalo

With research assistance from
Donald E. Barr, Steven P. Carstens, Christopher E. Bork,
Griffith Jones III, Mary Lou Loucks, and Marlene M. Jagalla
State University of New York at Buffalo

Contents

Introduction 2
Why this evaluation? History and Rationale.
What was evaluated? Project Overview.
Educational Worth 4
What has the project accomplished
that is of educational worth?
Impact 7
What has been the impact of the project?
Effect on the academic community and others.
Methodology 22

INTRODUCTION

Change Magazine has sometimes been called a maverick in higher education. Often taking a critical line against the sacred cows of academe, and using a journalistic rather than scholarly style, it has nonetheless built itself into a major force that helps shape the attitudes and practices of educational policymakers. With its National Teaching Project, *Change* once again has challenged entrenched attitudes, this time by undertaking, with the help of its first federal grant, two formidable tasks: to publicly elevate the stature of college teaching, and to evaluate fully and openly its efforts to do so.

Teaching is at once the most noble and least rewarded of faculty activities. Honored more with lip service than concrete gain, it has become a secondary activity for many faculty and often produces less pride than the completion of even the most abstruse and arcane of scholarly studies. For *Change* to employ its editorial talents and prestige to make teaching more important is a noble though possibly quixotic undertaking.

Why This Evaluation? History and Rationale

Federally funded projects are not typically evaluated with much rigor, despite legal requirements that evaluations be done and the enormous sums of money that are now spent on them. Such general negligence is due to a number of factors. Those who run the programs are often sensitive to the point of paranoia about criticism of their work, and they neither understand nor trust evaluators. Evaluators themselves are in the throes of fundamental disagreements about principles and practices and rarely agree on strategies or methods. Federal funding agencies are caught between their desire to help the programs they fund and the sometimes mindless demands of legislators and executive agencies for accountability.

Thus it is clear that when *Change* Magazine proposed to submit its National Teaching Project to "a strong, independent evaluation and to publish the results, good or bad," it was taking a risk. There was no undue pressure from the Fund for the Improvement of Postsecondary Education to make evaluation central to this project. Indeed, FIPSE was at first reluctant to have *Change* spend almost 15 percent of its final year's funds (but less than 5 percent of the entire project funds) for a process about which so many had reservations and which, in the current political context, might prove detrimental. In addition, there was no certainty that the project, as extensive and diverse as it was, could be appropriately evaluated. A major concern of project directors Richard Meeth and Joan Stableski was whether it was possible to get information about the program that would be useful to others.

The evaluation thus began with two general questions derived from consultation with the project staff, the questions most likely to provide information beneficial to others and to allow sufficient investigative flexibility and analytic depth. They were:

(1) What is the impact upon college teaching of a systematic national effort to celebrate successful teaching improvements?

(2) How effective is mass distribution as a dissemination device in efforts to improve college teaching?

A multi-source/multi-form data-gathering approach was devised to generate information, and the lines of inquiry were continually refined as the study progressed. Structured and unstructured mail questionnaires, personal and telephone interviews, site visits, and document analyses were used to secure information from as many relevant sources as possible. A total of nearly 1,400 items of information were gathered and examined to yield the conclusions presented here. In order to maintain a narrative flow and to avoid overly technical language in the presentation of the results, the description of methodology has been placed in the final section of this evaluation. (See page 22.) Our primary concern at all stages was to understand the nature and intent of the project and to expand or contract the inquiry as new evidence appeared.

What Was Evaluated? Project Overview

Any evaluation of the Teaching Improvement Project and the reactions that people had to it must be understood in the light of what *Change* in fact did. Therefore, a careful review of the project is preliminary to a discussion of its impact. Because of time and resource constraints, this evaluation deals with only the first two years of the three-year project. During that time, four Reports on Teaching were produced, each covering teaching improvements in three disciplines: Report #1 (March 1976) chemistry, history, psychology; Report #2 (July 1976) biology, English, political science; Report #3 (January 1977) economics, mathematics, philosophy; and Report #4 (July 1977) geography, music, sociology.

Each Report included a statement by George Bonham, *Change*'s editor-in-chief, and an analysis of teaching by project director L. Richard Meeth, followed by 25 to 30 articles analyzing specific teaching improvements. Articles were of two different types: Longer articles of some 3,000 words were written by prominent education writers from information gathered during a two-day site visit and supplemented with materials provided by the disciplines, the professors selected, and course participants. Shorter articles were written by other free-lance journalists, using program materials and telephone interviews. Each of the Report sections began with an overview article about teaching in that discipline written by a liaison person from the association, usually its executive director or the head of its teaching division.

From its inception in 1975, the project was guided by an advisory board of eight members: Kenneth E. Eble, professor of English at the University of Utah and chairman of the Committee on Teaching of the American Association of University Professors; Stanford C. Ericksen, senior research scientist at the University of Michigan's Center for Research on Learning and Teaching; Jerry G. Gaff, director of the Project on Institutional Renewal Through the Improvement of Teaching; Richard R. Johnson, formerly professor of psychology at Earlham College and presently director of research at the Exxon Education Foundation; James B. Maas, professor of psychology at Cornell University; Sheilah Koeppen Mann, head of the Division of Educational Affairs of the American Political Science Association; Hans O. Mauksch, formerly executive officer of the American Sociological Association; Wilbert J. McKeachie, director of the Center for Research on Learning and Teaching; and Paul L. Ward, executive secretary emeritus of the American Historical Association.

In addition to the publication of the Reports, the *Change* project involved a number of other activities, including two conferences held at the Belmont Conference Center in Elkridge, Maryland. The first convened representatives of the various disciplines to discuss how disciplinary associations could cooperate in fostering the improvement of teaching. It resulted in initiatives by several participants to emulate the work of the American Psychological Association, which had published a directory of innovations in teaching. Though a number of associations professed interest in such a project, to date no further action has been taken.

The second conference brought together a group of evaluators and directors of teaching improvement programs to develop a guidebook on the evaluation of such programs. That book, *Evaluating Teaching Improvement Programs*, prepared by William O'Connell and L. Richard Meeth, has been published and distributed. Two supplementary sets of short reports were separately produced for the disciplines of sociology and English and were widely distributed. In addition, a bibliography on improving teaching was produced and over 10,000 copies have been sent out on request. All of these materials are now in the public domain.

Under the terms of its grant *Change* was to produce and distribute 50,000 copies of each Report. In the case of the first four Reports examined here, *Change* exceeded that by at least 2,000. Table 1 shows the pattern of distribution as of January 1978. Within each discipline, copies were mailed to department heads, to members of association teaching divisions, to regional and national disciplinary conferences, and to the scholarly societies.

Table 1
Distribution of the Teaching Reports
(as of January 1978)

	Report #1	Report #2	Report #3	Report #4
Subscribers	25,295	23,047	21,149	21,349
Disciplinary Associations	14,648	12,102	9,500	9,640
Annual Meeting of the American Association for Higher Education	3,000		3,000	
Requests From Teaching Centers for Multiple Copies	8,000	9,023	11,200	11,500
Additional Requests	6,552	7,759	4,156	5,963
Remaining	205	69	3,995	3,548
TOTAL	57,700	52,000	53,000	52,000

Perhaps the most significant distribution strategy, however, was to offer free additional copies for special distribution. Over 400 individuals, institutions, and organizations responded to this offer, requesting from one to several hundred copies. Among those making such requests were over 200 teaching improvement centers, college consortia, state boards and commissions of higher education, and offices of instructional development. So great was the initial demand that *Change* was forced to limit requests to no more than 200 copies and finally to begin charging for the costs of shipping.

The Project Philosophy

In its initial proposal to FIPSE *Change* described its project on undergraduate teaching as a "national program of evaluation and reporting," the purpose of which was to publicly support and encourage good undergraduate teaching and to secure wider participation by disciplinary associations in efforts to reach similar goals.

The objectives of the project, according to an early set of guidelines to *Change*'s national network of education journalists, were to recognize some of the best, most effective efforts by faculty to improve undergraduate teaching; to provide a detailed descrip-

tion of these efforts in a readable, nonacademic style; and to encourage faculty to consider approaches outside their fields and institutions.

Early project documents made much of the emphasis on the *evaluation* of improved teaching and of careful investigation of which aspects of the teaching approaches being featured were effective and which were not. Prior to publication of the first Report, however, diverse descriptions of the project made it unclear exactly what the Reports would focus on: Would it be innovative teaching, exceptional teaching, effective teaching, or improved teaching?

In the process of determining the criteria for selection of teachers to be featured, a rethinking of earlier definitions occurred, resulting in a decision that the primary emphasis in the project was to be on "improved teaching." In the third Report, project director Meeth discussed the alternatives that had been considered (and in fact used in some of the initial documents) and pointed out why each had been discarded as inappropriate.

The notion of good teaching was rejected because it "implied some absolute standard that has yet to be identified." The term "innovative teaching" was found to mean too many different things to different people. And "unique teaching" was rejected because the term itself was inaccurate; "many excellent teaching experiences have been created many times over by different people in other settings with equally effective results." The notion of improved teaching did not, according to Meeth, require that projects have universal applicability, nor that they be complete models of effectiveness. According to the project literature, improved teaching of a course means that the professor teaches it more effectively than before although not necessarily better than anyone has ever taught it. The standard is whether a teacher has consciously changed his work so that it is "less ambivalent, more pointed and efficient."

By the publication of the third Report, *Change* had crystallized its strategy of celebrating improved teaching through highlighting the good features of specific teaching improvements; not unique innovations, nor examples of the best teaching, but of teaching which seemed to be better as a result of a faculty member's attention. Though its early proposals reflected a more elite emphasis (the evaluation of "excellent" teaching), the program allowed a more useful definition to evolve, reflecting a philosophy of remaining open to change.

EDUCATIONAL WORTH

"Too little attention is paid to the quality of undergraduate teaching in America."

"Professors lack the resource materials they need to improve their interaction with students."

"Teaching is not given the importance of research and publication."

These were the problems *Change* set out to address in its National Teaching Improvement Project, a venture with four primary goals, as outlined in the report covering its first two years:

- *to identify some of the most creative, effective teachers across the country,*
- *to ask the disciplinary associations to examine the state of teaching within their fields,*
- *to give national publicity to outstanding professors who are effective in the classroom, and*
- *to saturate the academic community with a lively, readable publication about teaching approaches shown to be effective in helping students learn.*

The extent to which these goals have been achieved is assessed here against a modified version of the project's own criteria format used in the selection of professors featured in the Reports on Teaching. There are three levels of criteria: Immediate criteria refer to the sense of the experience and include the perceptions and attitudes of those who were involved in the project either as featured professors, distributors or recipients of the Reports, Advisory Board members, or officials of the participating disciplinary associations. Intermediate criteria include ways in which the practices of the project fit logically with its goals and could be expected to lead to their achievement. This involves the Reports, an assessment of their quality, and their relationship to the purposes of the project. Ultimate criteria refer to changes that have taken place as a result of the project, insofar as they were consciously sought.

The Goals and Their Achievement

Goal #1: To identify some of the most creative, effective teachers across the country.

In a few instances, teachers featured in the Reports discovered that they were viewed as special; and,

while avoiding words like "creative" and "exciting," still expressed a sense of enhanced self-esteem. But for most this reaction was less heady and very short-lived, particularly when colleagues ignored or subtly denigrated the honor.

Change's approach to this goal was problematic. The project began with the goal of identifying the "most creative," "most effective," and the "best." But the difficulty of defining those terms, much less judging teaching efforts for these qualities in the political context of higher education, led to a major change in goals. The more modest (and eminently more realistic) goal of identifying "improved" teaching was *Change*'s response to the futility of searching for "the best."

In its selection methods *Change* relied on the disciplinary associations, few of whose officers felt able or willing to decide who were the most creative and effective teachers. Yet, clearly, being featured in a prominent national magazine as an outstanding teacher implies some degree of superiority. An unfortunate consequence of this conflict was that some readers, expecting descriptions of the best, found rather more ordinary mortals being described and tended to react with skepticism or a lack of interest.

Despite the problems of definition, the project did uncover some truly creative teachers, as attested by the number of readers who wrote for more information or visited them. In a slightly different vein, the project uncovered and described some useful new teaching methods (and explored valuable new perspectives on traditional approaches, such as lecturing and field work) that have generated substantial interest.

Goal #2: To ask the disciplinary associations to examine the state of teaching within their fields.

The project neither perceived itself nor is perceived by the disciplinary associations as having initiated an examination of teaching within the disciplines. Rather it is seen as having provided a forum, a vehicle, and an opportunity for such an examination to begin or accelerate.

Seeking cooperation from the disciplines at the outset, the *Change* staff made every effort throughout the project to accommodate disciplinary concerns, tailoring the Report format and distribution system to the disciplines. Some involved in professional faculty development movements criticized this all-out attempt to involve disciplinary groups, contending that teaching is and always will be secondary to the disciplines. But *Change*'s editors believed the most successful avenue to faculty would be through the disciplines, and so that road was chosen.

There is little persuasive indication that many disciplinary associations have increased their attention to teaching, despite productive collaboration over the course of the project and the fact that associations had to examine teaching in order to participate. Disciplines where such attention flourished prior to the *Change* project, e.g., sociology, made some fruitful use of their involvement in the projects; a few individuals were profoundly affected by it but most were not, and the discipline continued its interest in teaching under a quite separate motivation. Special efforts that *Change* made to encourage further disciplinary association interest (e.g., the first Belmont conference) led to brief interest and little else. *Change* itself will continue to collaborate with the associations and will benefit from what it has learned; but disciplinary interests will most likely shift back from pedagogy to content, from teaching to scholarship.

Goal #3: To give national publicity to outstanding professors who are effective in the classroom.

To judge by all three categories of criteria, the project did give national publicity to professors who, within rather narrow definitions of the terms, were both outstanding and effective in the classroom. The clear impressions of virtually all featured professors, substantiated by the many comments they reported receiving from others, was that celebration in a *Change* Teaching Report made them somehow more visible within their fields.

The project format of mass distribution, coupled with both *Change* Magazine's national image and that of the national disciplinary associations, enhanced further the prestige that came with being selected. In addition, the selection process brought to light teachers whose work was outstanding since, formally or informally, the teachers were selected through a kind of competition. The heavy emphasis on evidence of student achievement, which guided both those making selections and those writing the articles (even when that evidence was limited to student perceptions), highlighted the teachers' classroom effectiveness. However, lack of formal standards for comparison makes it impossible to say that the most effective teachers were chosen, or that their effectiveness could be judged by how much their students learned.

Growth of the reputations of teachers featured in the Reports was neither widespread nor uniform. A few experienced dramatic shifts in their national prominence while most others could discern little difference. Those whose names became more widely known received invitations to speak at conferences and occasionally found it easier to get a publisher's attention; but virtually none received job offers from other institutions.

Goal #4: To saturate the academic community with a lively, readable publication about teaching approaches shown to be effective in helping students

"Saturating the academic community" is obvious hyperbole for the project's aim to distribute the Reports as widely as resources would permit. Strictly speaking, this goal was not realized; nor was there a sense among the editorial staff, the Report distributors, or external observers that the Reports were widely known and used as part of the day-to-day academic world. That the Reports represented "a lively, readable publication" was disputed by virtually no one, including detractors who would have liked a more scholarly or didactic style. While the magazine format offended some, far more were attracted by it.

The logic of *Change*'s approach—using its well-known format, its national mailing system, indeed its entire staff to produce and distribute the Reports—cannot be faulted. *Change* subscribers are 70 percent faculty and so were precisely the audience that would most appreciate the Reports. Distribution through the disciplinary associations, particularly to department chairpersons, was an especially effective mechanism, and offering free copies was sensible. Assessment of the mass distribution was strongly positive.

The Reports displayed a high level of technical excellence, which was a critical factor since they had to compete for attention with the overwhelming flood of material that faculty receive. In fact, virtually all observers gave uniformly high marks for quality. The group most sensitive to what was written, the teachers who were featured, were nearly unanimous in their praise for the articles about their work.

Distribution was widespread but not concentrated. Those whose business is teaching improvement and faculty who already subscribe to *Change* were most likely to pass the Reports on to their colleagues, but beyond them there was little indication of further distribution. The paucity of new *Change* subscribers generated by the Reports (a disappointment to the staff) and the rather lukewarm estimates of impact from the disciplinary societies illustrate the great difficulty of even penetrating, much less saturating, the academic community. Some evidence suggested that coupling national distribution with personal reinforcement—a kind of traveling salesman approach—could improve distribution and exposure, but much more study is needed before a definite conclusion can be drawn.

The Consequences

Beyond the direct goals of the project, and often as a result of realizing those goals, the consequences of the three years of time, effort, and money can be described and evaluated. Such analysis is an interpretation of many strands of information and, along with reactions of external observers, it represents a final assessment of the project.

The sense of the project's educational value as perceived by those involved with it comes from several different sources. No one harbors any illusions that the project has had any massive influence on the importance or the quality of teaching or on student learning. But along with that realistic appraisal goes a sense that there have been several valuable outcomes. Indeed, to expect more in as diverse a context as American higher education would be extremely unrealistic.

Advisory board members offered their views of the project's value: James Maas saw the project as a start. When *Change* pulled together a number of different teaching approaches, it created a model for the disciplinary associations to follow. Jerry Gaff and Stanford Ericksen agreed that an important contribution of the project was to divest teaching of some of its mystique. David Justice of FIPSE echoed this view in observing that the articles put to rest the myth that good teachers are born and not made. The Reports have achieved this demythologizing, according to Sheilah Koeppen and Richard Meeth, by providing a resource for new ideas which, if successful in practice, can be added to one's teaching repertoire.

Finally, the project has been valuable in encouraging the idea, buttressed by national visibility, that improved teaching is something to be rewarded. When a teacher contemplates expending effort to improve his work, he is faced with the virtual certainty that no economic benefit will result. Through the Teaching Reports, *Change* has provided support for creative efforts that will increase the likelihood of more teachers putting their ideas into practice.

One dimension of the worth of the project has been the lessons it has afforded in conceptual clarification and development. The evolution of its self-definition from "evaluation of teaching excellence" to "celebration of teaching improvement" is an object lesson in the way a project can remain open to criticism and respond to it. Central to this evolution is the careful use *Change* made of its advisory board, and its receptiveness to new ideas and procedures suggested by reader critiques. *Change*'s openness to review generated, in the project's third year, another instance of logical advance. Amid the clamor for evaluation by funding agencies and the often defensive attempts of projects to minimize it, *Change* committed itself and a substantial portion of project resources to a comprehensive evaluation. Since the project was ending, the evaluation could not benefit it directly but could provide a model for comprehensive assessment of innovative teaching improvement programs.

According to Rogers and Shoemaker, authors of *Communication of Innovations*, adoption of an edu-

cational innovation takes place in several distinct phases. It begins with a person's exposure to the innovation, which yields some understanding of how it functions. Next a pro or con attitude toward the innovation is formed, which leads to a choice to adopt or reject it. Having made the decision, an individual seeks confirmation from others or by actual trial.

A mass dissemination project such as *Change*'s operates at the first stages of the adoption process and thus can reasonably be expected to pass along knowledge of teaching improvements to Report recipients. It may in addition lead some to seek more information, develop different attitudes, or even try out a new idea; but formal adoption of the idea is likely to be rare. Print media are theoretically prime channels for opinion leaders and usually fulfill an information-giving function. For transmitting information the written word has yet to be surpassed. It is easily disseminated and the reader can refer to it readily and absorb it at his own rate.

The capacity of a national distribution system to spread ideas over larger distances than are convenient for individual travel is, during these days of fiscal exigency, one of its more attractive features. For a developmental mathematics program in Oregon to discover work being done in Palm Beach, Florida, or for an undergraduate sociology instructor in southern Arizona to read in detail about similar work in Boston, represents a unique benefit that only a national print medium can provide.

These theoretical considerations suggest that the *Change* national distribution project can be termed reasonably effective if it succeeded in exposing a substantial number of recipients to information about teaching improvements. If it succeeded in generating interest and inspiring attempts to adopt some of the techniques, then it may be considered even more successful. Finally, if it should in fact lead to changes in the teaching practices of individual professors, it could be considered eminently successful.

Evidence of the project's worth lies in the educational products it has generated, the communication network it has produced among teachers, and the profound changes it has wrought in individuals. By the end of this project, six Reports covering fifteen disciplines and one set of interdisciplinary programs will have been published. These documents are available for content analysis, for study, and for reference. In addition, the program produced two supplemental booklets, a bibliography on teaching, a booklet on the evaluation of centers of teaching improvement, and a guide to effective teaching to be published shortly by Change Magazine Press. The ideas in these documents represent an array of methods, styles, and materials, and as such provide a continuing resource for improving teaching.

Whether the substantial network of teachers who share methods and problems will grow or recede in the absence of continued stimulation is still impossible to determine. Perhaps *Change*'s plans to highlight improved teaching in regular issues of the magazine will enable the network to expand and encompass more teachers in more diverse fields.

Finally, however, the worth of the project is represented by its effect upon individuals—teachers who were featured and whose careers benefited and professional contacts increased, and teachers who read the Reports and were moved to write for information or to change their own teaching. Since it cannot be determined with any precision just what proportion of college teachers made actual changes, there is no basis for supposing that such occurrences are common. Nevertheless, mass distribution methods realistically generate knowledge and little more. When over 20 percent of even a potentially biased sample report that they have changed their behavior, it is reasonable to infer that the benefits and worth of the project have been real.

IMPACT

The National Teaching Project involved many individuals and organizations: the disciplinary associations, the professors whose work was highlighted, the readers of the Teaching Reports and those among them who contacted the featured professors for more information or advisory help, those who distributed multiple copies of the Reports, the funding agency, and, finally, *Change* Magazine itself. The following is an analytic description of the amount of impact the project had on these disparate members of the academic community.

The Disciplines

The disciplines involved in the teaching improvement project were initially self-selected. A letter went out from *Change* describing the project and asking some 40 associations if they were interested in

participating. Out of those that expressed interest, 12 major disciplines were selected for the first two years of the project, representing those academic areas most commonly a part of undergraduate education. The participating associations were: the American Chemical Society, the American Historical Association, the American Psychological Association, the American Institute of Biological Sciences, the Association of Departments of English of the Modern Language Association, the American Political Science Association, the American Economic Association, the Mathematical Association of America, the American Philosophical Association, the Association of American Geographers, the Music Educators National Conference, and the American Sociological Association.

Change included in each Report one natural science, one social science, and one humanistic discipline. Although there was some concern that the mix of disciplines was not appropriate, the project's purpose was to urge readers to seek information that could be used across disciplines. It is likely that no choice would have been immune to criticism. Since selection of the disciplines depended to a certain extent upon the willingness of the associations to cooperate, not all disciplines could be covered. Also, since only three disciplines appeared in each Report, the selection had to be limited. Another factor was the separate teaching and academic associations that exist within some disciplines, resulting in a lack of communication between those interested in teaching the discipline and those interested in its research.

Once a discipline was chosen, the associations themselves decided on the procedures whereby individual projects would be identified. A wide range of procedures was used, from a very formal "contest" to selection by one individual. Between those two extremes, different identification methods included advertisements in disciplinary journals, perusal of disciplinary association records, and publicized requests for nominations.

The Association of Departments of English of the Modern Language Association used by far the most complex procedure, beginning with an advertisement in its official publication. Those responding to the advertisement were instructed to prepare a two-page, single-spaced, typewritten statement indicating how their teaching project fulfilled *Change* Magazine's criteria; a five-page, single-spaced, typewritten document describing the teaching project and showing how it was in fact an improvement; a copy of the course syllabus; a description of the method of evaluation of the course; and a number of letters of recommendation attesting to the course's effectiveness, uniqueness, and appropriateness. Each entry was sent to two members of the association's committee on teaching and was rated before being sent on to *Change* for final selection.

A considerably less elaborate procedure was used by the Association of American Geographers. AAG advertised the teaching project and called for interested faculty to submit descriptions of their courses. Only eight individuals responded to the request with supporting materials, all of which were forwarded to *Change* since each represented a distinctive teaching approach. AAG was unwilling to rank the entries but did group them according to certain qualitative standards: degree of concern about teaching and learning, sense of wonder about using new experiences, and uniqueness. AAG later submitted a number of additional recommendations, along with a detailed matrix of how the various approaches countered many of the stereotypic definitions of the discipline.

The American Economic Association was disappointed in the response from its members to a similar procedure. G.L. Bach, then chairman of the AEA committee on economic education, subsequently turned to his own committee to make the nominations and forwarded to *Change* a detailed description of each nominated project presented in the order "of interest."

Public requests to members of the Mathematical Association of America were not successful either, according to A.B. Willcox, MAA's executive director. He would have preferred 10 times as many responses, which would have made it possible to screen some of the articles. Willcox asserted that there really were not a lot of innovative teaching experiments going on in mathematics. Those that everybody had known about in the 1960s had "just evaporated."

The American Sociological Association publicized the *Change* project three times through its official publication, which has a readership of 14,000. It received 60 responses. These were divided into five categories: "top priority," "worth knowing about," "interesting," "useful but not priority," and "this shouldn't see the light of day." Hans Mauksch, project advisory board member and liaison for sociology, thought that the association could have made a more intensive selection effort, perhaps coming up with more outstanding projects. But that would have created what he called "vulnerable expectations" in such proportion that "the negative impact for those penalized by not being chosen against those rewarded would not have been worth all the excitement it would have caused."

The American Historical Association selected its projects in a much less systematic way. Warren Hollister, vice president of the AHA teaching division, and Mack Thompson, association executive director, together identified those they thought were doing "some interesting things." Their source of information was a "finger on the pulse" of their discipline, a reliance on people they knew or had heard of.

At the opposite extreme from the highly complicated and specific selection approach of the Modern Language Association, the American Institute of

Biological Sciences chose its participants in the least systematic way. Richard Dodge, then head of the AIBS education and communications department, sent *Change* a "list of individuals involved with what I consider to be good undergraduate teaching programs at both two- and four-year institutions." These were listed in the order of Dodge's preference, and a brief description and the rationale for his choice were given. There is little or no indication of any formal involvement of the association members in the selection process.

Summary

The selection of projects within the disciplines thus varied widely. Some showed evidence of intense efforts to attract large numbers of candidates along with careful examination of their programs. These disciplines, such as English and sociology, also were the ones that generated the largest number of potential nominees. Others exhibited more limited but still concerted attempts by members of teaching committees to ferret out and analyze carefully as many different approaches within the discipline as could be related to the project criteria. The liaison persons for some disciplines, however, made what seemed to be almost off-the-cuff recommendations based upon informal communications or the personal knowledge of one or two people. In at least two instances this led to the selection of programs that seemed to one critic to be inbred and derived from the "old-boy network."

In a few instances, professors serving on the committees making the selections were also among those recommended. In the light of the varied selection process, this is not at all surprising. Nor is it necessarily bad, for as one committee member put it after suggesting that his own work be considered, "A man is a fool if he doesn't know the value of what he's doing."

Disciplinary Reactions to the Project

Those who served as liaisons with *Change* from the disciplines had mixed reactions to their involvement in the project. Mathematics head A.B. Willcox thought that the *Change* coverage was reasonable. "It certainly included a description of all of the innovative projects in teaching that we were able to uncover," he said. "We gave fairly wide publicity to it, and I would have to say it was a fair representation." While he thought that the *Change* articles had had a strong influence on the association's regional meetings, Willcox could not think of any specific instances, except for a vague recollection that the math anxiety question had come up at one meeting, and he thought that "perhaps it had been featured in one of the Teaching Reports." When asked if the association had used the Reports in any way formally or informally beyond distributing them, Willcox replied that they hadn't and "do not have any plans to at the moment." Within the association the *Change* project and the issues it raised were dormant. "The association was involved in helping get material for the *Change* Report," he said, "and members read it with great interest, but that was about it."

Even sociology, which had distributed the Reports widely, used them in conferences, and given them a great deal of publicity, did not see them as having had a significant direct impact. To Hans Mauksch, the Reports were part of a multilevel program in the association for making teaching more important, one part of some eight to nine thousand pieces of material being made available to sociology faculty. As a resource, the Reports made a contribution, but only at the initial level of his association's "very political" project involving professors in organizing and developing strategies for action.

Edmund Worthy, assistant executive director of the American Historical Association, suggested that the articles conveyed a sense of the excitement going on in the discipline. He was concerned about the "piecemeal nature of the *Change* approach" and characterized the Reports as more impressionistic than thorough. But he thought that a more accurate picture of what is happening in history would be very difficult to obtain since even the association does not have that kind of information. Worthy was unaware of any impact that the Reports had had. He did not recall any reaction, even an informal response to the publication of the Reports.

Theodore Tellstrom of the Music Educators National Conference was unaware of any formal use of or reaction to the Reports within his discipline. He believed that the Reports were helpful to the association because "the magazine does travel the gamut, particularly in higher education," and therefore he thought that other disciplines "appreciate what we are trying to do."

It appears safe to conclude that the project had relatively little lasting effect upon the disciplinary associations. Due to rapid turnover of association staff members, it was not possible to assess the effect on all participating disciplines, and several of the *Change* staff thought that at least a few of the disciplines were in fact strongly affected by their involvement. But it is reasonably clear that *Change*'s objective of making an impact on the disciplinary societies was not met. Advisory board member Wilbert McKeachie, commenting on his own discipline of psychology, noted that *Change* simply does not relate to professors through their disciplines. "A typical psychologist," he said, "would not know anything about any of the people" in the Reports. "I suspect," he concluded, "that a large number have never seen the *Change* Report. Thus its impact on psychology is much more limited than it could have been." Much the same could be said for the other disciplines as well.

The Professors

Reactions received by professors featured in the Reports came from both inside their own institutions and from the wider academic community. These reactions were reported to us in personal and telephone interviews and through responses to an open-ended mail questionnaire. Over 60 percent of the professors featured in the first four Reports described their experiences.

By far the most frequent reaction to the article about a professor's work took the form of letters from the president or academic vice president of the institution, letters seen as universally warm and positive. The president "took the time to write me a nice letter," said one professor. Presidential letters praised the professor for "bringing national recognition beneficial to the professor and to the college," and for "offering unique educational opportunities to students." One university chancellor invited a professor to present a paper at a European conference.

Teachers who received such congratulations valued them as one of the more important rewards for having been featured in the Reports. As one put it: "Personally, the recognition from *Change* Magazine gave me a pat on the back for my teaching efforts at a time when I particularly needed it." Another commented, "I think I have received more comments from colleagues, administrators, and former students about the article than about anything I have done. Even the furnace repairman wrote me a letter after reading about it in the [college] newspaper." Another commented that his program had been recognized by the university as a successful project and that students associated with it experienced a great boost in morale.

Beyond such official letters (which may have been triggered by an announcement of the article sent from *Change* to the president of each institution whose professor was featured), the reaction on campus was mixed. One professor commented, "The general reaction on this campus has been one of congratulations. But no one has offered to run me for Congress yet." Others reported that the article was essentially ignored. As one put it, "None of my colleagues mentioned the article, although copies of the Report were circulated to each." "Restrained" was the word used by one featured professor to describe the reaction of his colleagues. "Mixed, mostly negative, or no acknowledgment of its existence" was the experience of another. From a professor in a research-oriented department came the comment that "time has neutralized [colleague reaction] from

The Professors: Pat Jordan at Colorado State University

When the BioCO-TIE program was featured in Report #2, it was already a comprehensive and very successful venture in the eyes of the National Science Foundation and many biology people around the country. Colorado State University (CSU) and the 14 participating two-year campuses had developed a vastly improved package for their core curriculum; and they had proved that a large research-oriented university could work with two-year institutions.

Did the article add to the success of the program? According to Pat Jordan, an established, persuasive biologist and the key person from CSU working on BioCO-TIE, the article provided "the capstone to an already completed, successful, and highly profitable [in terms of usefulness] kind of program." According to Frank Vatano, dean of the College of Arts, Humanities, and Social Sciences, the article represented "a ribbon on the present—they had arrived." They both now think that as a direct result of the article CSU is known as one of the leading institutions in the nation in the teaching of biology.

Frank Abbott, Colorado's commissioner of higher education at the time the article was released, had a similar view. "I now view CSU as a leader in the state in using innovative teaching ideas," he said. "The article adds one more arrow to the quiver because it came from a third party and was chosen in a national search. The recognition is something to be treasured." Jordan suggested that the recognition "gave the program a credibility that it never would have had otherwise."

Jordan and Vatano said that before the article they had gone to different parts of the country conducting a "song and dance road trip" publicizing the program for those who requested it; thus, it had already had some national visibility. "Now," says Jordan, "we have communicated with people we never would have if the article had not come out in *Change*." They had had requests for information from Florida to Alaska and most states in between. Visitors came from Mexico, Iran, Iraq, Brazil, India, the USSR, Venezuela, Italy, Japan, England, and Israel. The Mexican government wanted to do a Spanish sound track on many of their materials. The number of requests and visits picked up considerably after the article was published.

The article had an impact in other ways also. Jordan points out: "The consortium of institutions [the two- and four-year institutions involved in using the BioCO-TIE materials] has been strengthened by the article. Even though the program no longer receives federal funding, the consortium has continued to meet on a regular basis and to function well." Garnie Johnson and Willie Gore, the teachers from Northeastern Junior College in Sterling, Colorado who originally discussed the idea with Jordan, believe that the article brought the group closer together. They and Jordan presented a picture of a group of professionals working together, gaining national recognition, and being

being hostile to being merely suspicious." One professor who received congratulations from various individuals in the college administration had heard "not a word" from his conservative department chairman.

Psychological benefit, a feeling of importance and of having accomplished something of worth, seems to have been the major benefit derived by featured professors. It is unfortunate but probably inevitable that at a few institutions the consequences were negative. Featured professors noticed with chagrin when their own colleagues ignored the project, or, as one put it, when faculty within his department responded "almost jealously." But such negative experiences were not widespread and the overall reaction seems to have been positive.

Effect Upon Professional Status

An overwhelming majority of the professors reported that being featured in the Reports had no effect on their professional status. But several did describe changes that seemed related. One had been asked to do workshop and seminar presentations that "established an aura of credibility" for him, "a kind of expertise within the establishment." Another commented that his reputation had changed somewhat, from that of a fairly abstract scholar "whose tastes ran to the arcane" to someone who can both teach and publish.

Not all changes were beneficial, however. A department terminated one featured professor in spite of the article in the Report. He had been one of only a few faculty devoted to teaching full time, and his department apparently was not interested in establishing a separate teaching faculty. "Recognition of accomplishments in teaching," he said wistfully, "does not carry much weight among the faculty in research-oriented disciplines."

There were several, however, whose careers changed substantially as a result of having been featured in the Reports. One who had not been recommended for reappointment was given another probationary year after the article about his work appeared. Three others were promoted to tenured positions, and one was asked to take on half-time administrative duties as director of undergraduate studies. Another received a merit increase and promotion partly if not largely as a result of the article. At least four professors thought that being featured had helped publication or sale of their textbooks.

Peter Facione of Bowling Green State University and his colleague Donald Scherer, featured in the third Report, told three publishers about the Report while trying to persuade them to publish a textbook

strengthened by their success and recognition.

Ruth Johnson, another biology instructor involved in developing the program, said the feeling was, "Hey, this is really legitimate." This feeling among the group also served as a catalyst in spreading enthusiasm for the program to others in the state. The group now feels confident, according to Gore, that since they were successful they will meet with success in future endeavors. In fact, they have started working on another project that they expect will be costly, but they are confident they will receive adequate funding.

The Office of Education Media (OEM) at CSU played a key role in providing the technical expertise for the BioCO-TIE materials. Preston Davis, director of the OEM, comments, "I don't really know if the *Change* article had anything to do with this, but we are being looked at more and more as a leader in the field of instructional media."

After the 1976 article Davis was asked to contribute to a four-part series in *Technologist Horizons in Education*. He was described in that journal as an "innovative leader in education media." In a 1977 publication, *Communications Technologies in Higher Education*, CSU is described as "the king of the videotape users." Davis believes that the *Change* article aided in this national visibility. Further, Davis says, "The exposure definitely allowed OEM to assume a posture whereby we didn't have to sell our advantages to professors on campus."

Davis has shown the article to state legislators so they can see and appreciate how the university is spending tax money. He believes this was helpful because legislators often consider educational media a "frill." He described an incident in which the CSU campus was visited by a joint budget committee of the state legislature and by the interim committee on higher education. They saw the BioCO-TIE materials and the national recognition the program had received in the Report; and Davis thinks they left impressed that CSU was taking a leadership role in media resources in the state and the nation.

Frank Abbott summed up a major impact of the article. "When the articles were coming out there were state legislative questions as to whether the funding that was going into BioCO-TIE and educational media was worthwhile. Also, among the other two-year colleges, there were academic concerns at the legislative level about whether the university would become dominant in shaping the curriculum.

Although *Change* can't be credited with clearing the whole thing up, with the passage of time the article had a very salutary effect on the legislative understanding of some of the administrative funding of CSU; and it was made clear that CSU as the leader wasn't shaping the curriculum alone, but that there was a lot of cooperation with other institutions of the state." —DEB

based upon their work. "I think," said Facione, "that we gained quite a bit of credibility with the publishers because *Change* had thought enough of the approach to give it some attention." It was especially helpful with the first publisher, who was afraid it would be risky to publish a book that used rather standard pedagogy in a non-standard area of philosophy. About 60 other schools have contacted Facione or his colleagues about aspects of their work, "mostly as a result of the *Change* Report, though sometimes because of some of our subsequent publications."

Most of the courses taught by featured professors remain much the same or continue to develop in the way they had been developing when the articles were written. Changes that were noticed by some of the professors included a good deal more legitimacy within the institution as a result of national publicity. Someone from outside had recognized the validity and importance of what was being done, which in a couple of cases was helpful to the program in achieving support from colleagues and the administration. One professor said, "It sort of made us acceptable in the academic community." Another commented, "It has helped to legitimize and validate the nature of our experimentation." This had an important effect on the staff, who now "perceive themselves as more significant educationally and institutionally."

Off-Campus Reactions

It was from outside their own institutions that most of those featured in the Reports received the greatest attention. National mass distribution seems to have brought their work and their accomplishments a great deal of publicity which they would not have received if *Change* had not published the descriptions. Featured professors each received from 1 to more than 100 letters from outside their own campuses congratulating them and asking for information. These reactions more than anything else made the experience worthwhile for them.

Lois Beishir of Antelope Valley College in La Costa, California, was "astounded" by the reaction to the article about her work. She received many written requests for further information and also had "several classroom visitors as a direct result of the publication of the article." The overall impact, she thought, was that her national and even international recognition has been increased greatly. Sales of a book about her biology laboratory course "have

(*Continued on page 14*)

The Professors: William Burke at WCLA

Gratitude for the opportunity was William Burke's predominant reaction to having been featured in Teaching Report #2. The article, he said, gave his Washington Center for Learning Alternatives (WCLA) the credibility it needed to "succeed in our mission." Bill Burke is a young, adventurous academic who left a secure post as head of the internship program at the University of Massachusetts at Amherst, borrowed $200,000, and established a nonprofit, independent educational institution. WCLA's undergraduate student internship program was described in a brief article in July 1976 in the section on political science.

Since then the program has developed dramatically. "During the past two and a half years," said Burke, "the program has grown from 25 to over 200 institutions from 47 states. In fall 1975, we were assisting 53 students. In the spring semester of 1978, we had 210 students. In this fiscal year, WCLA will have a balanced budget and will have completely amortized all its start-up expenses." A good deal of this growth can, in Burke's view, be attributed to the national exposure that *Change* and FIPSE provided.

"In the beginning, a lot of institutions would call other institutions and say, 'Who is this guy Bill Burke? What is WCLA? Do you think they are legit?' " After the publication of the article WCLA made 4,000 copies and sent it out along with other material about the program, thus bolstering the organization's credibility. "I think the program would have grown without the article," said Burke, "but not as fast. Besides, it's always great to be recognized. Young organizations need recognition—not only for the credibility but also to realize that other people are noticing their work. The article was of tremendous help in making us acceptable to the academic community."

Besides credibility, the article gave visibility to the program, as evidenced by letters from 50 people at universities and colleges around the country, all of whom had seen the article and requested further information. In addition, more than 100 people have greeted Burke at conferences and mentioned seeing the article in the Report.

Before the article was published, WCLA had not received any significant funding from foundations or corporations. Since then, however, it has received assistance from foundations and corporations totaling $184,000. "Every time I went to a foundation looking for money, I brought a reprint of the article and presented it. Whether they read it or not wasn't important. It was the fact that *Change* had chosen us. And I'm sure they were familiar with the Reports on Teaching and knew that those chosen formed a select group."

Burke and his associates at WCLA firmly believe that the article had a positive impact on their program. Being featured in the Report allowed an alternative, viable, and valuable undergraduate learning experience to grow and prosper at an accelerated rate; and it was successful in fostering the art and concept of field experience education. Burke thinks that FIPSE should be applauded for funding the program and hopes other foundations may start similar projects. "There is not enough said about the good things happening," he said.—DEB

Requests for Information: Palm Beach Junior College

When Richard L. Travis was recognized by *Change* Magazine for his work with individualized learning in mathematics, it reinforced his visibility as a proponent of and practitioner in developmental mathematics. In the 15 months since Travis was highlighted in the January 1977 Report on Teaching, he has been further acknowledged as a prominent innovator in math instruction. Campus and local newspapers reported that he had been selected by *Change* Magazine as an "outstanding college teacher"; and his own administration at Palm Beach Junior College, location of his Math Learning Center since 1962, sent him a congratulatory letter.

But the most heartwarming recognition of his accomplishments has come from his colleagues across the country. Yoon Byunn from Shelby State Community College is one such appreciative math instructor. In a letter to Travis he wrote: "I have read with great admiration your article. I would like to congratulate you on your success in individualization of the developmental mathematics course." Other colleagues initiated correspondence in the hope of finding solutions to nagging problems. Faced with a large number of students who lacked the necessary skills to succeed in college-level mathematics, Harold Stephens from Memphis State University wrote to Travis: "Perhaps the program that you direct is the answer to some of our problems with those students." Dennis Paul from Medgar Evers College reflected the feelings of many inquirers when he wrote. "Your program seems to offer many possible solutions to our problems."

While serving as a troubleshooter for some, Travis was most often asked to provide a complete description of policies, procedures, and materials used at the Learning Center. Mary Jane Meincke of D'Youville College wrote, "What I am interested in is some very practical advice about setting up, equipping, and staffing a math lab." In all, Travis corresponded with 27 people, providing them with data, outlines, program descriptions, and answers to specific questions. Travis's responses were informative and encouraging. Many letters ended with his personal plea for cooperation: "Should you have any questions, please feel free to call, write, or visit. I think all of us in mathematics are having the same problems. That's why the exchange of ideas is helpful."

Although Travis is enthusiastic about sharing information through correspondence, he prefers personal contact as a means of developing meaningful dialogue. It is not surprising then that he has encouraged many to visit his Learning Center. Eight people described their experiences to us.

Visitors were first given a tour of the facilities and a general explanation of how the lab was used. Following this, a member of the center staff would describe the specific instructional procedures and present the materials used in the course modules. Next, visitors were left alone to observe the teaching/learning process. Guests would typically interact with the staff and students, hoping to understand the pluses and minuses of such an operation. Finally, Travis would meet privately with the visitor to review the day's activities, to answer questions, and to discuss how the principles learned could be applied at the guest's home campus.

How did visitors react to this experience? All were pleased with their trip to Lake Worth. Sue Schiller, from the Learning Skill Center at the University of Pittsburgh, said, "I evaluated his program in terms of how I might incorporate it into my own program." Although her program has turned out to be distinctly different, Schiller admitted that the meeting with Travis had been a positive experience and was instrumental in giving her the confidence to go ahead with her plans for a math workshop at the University of Pittsburgh.

Administrators were also attracted to Travis's developmental math program. Robert Marcus, dean for undergraduate studies at the State University of New York at Stony Brook, visited the center in search of a way to remedy math deficiencies of minority students enrolled in a special engineering program funded by the Sloan Foundation. Marcus was most encouraged by the fact that rather than relying heavily on advanced instructional technology, the Palm Beach approach emphasized pencil and paper exercises and programmed mastery learning.

Mathematics instructor Robert Fray from Furman University visited Travis after hearing that he had "the best mathematics laboratory in the Southeast." With seed money from a Kellogg grant, Fray hoped to establish a lab that used a competency-based approach to precalculus math. After the visit, Fray admitted, "We completely changed our ideas from what we had originally planned. Travis's ideas were more simple, less machine oriented, and placed greater emphasis on personal contact with the individual. We were very impressed with Travis, his work with people there, and what he knew about developmental math. He would be the first person we would go to if we had a question or problem."

All told, Travis has received more than 30 inquiries (letters and phone calls) from all over the country, a large number of which have come from schools in the Midwest. Travis suspects that this trend is largely due to the fact that remedial and developmental math have been used in ongoing programs for some years on the West Coast and in Florida but are just now being adopted in areas such as the Midwest.

From Travis's viewpoint, the experience of being highlighted in the *Change* Teaching Report has been most rewarding. "I was very pleased with the responses, and from them realized that *Change* is circulated in a great many areas. No one method of dealing with students is suited for everyone or every college curriculum, but diversity, communication, awareness, and change are certainly needed to meet the needs of an ever-changing society and the student within it."

Evidently Richard Travis has been and continues to be a powerful influence on an emerging national interest in developmental mathematics. Being featured in one of the *Change* Teaching Reports has broadened and intensified his influence on the design and improvement of math laboratories throughout the country.—SPC

(*Continued from page 12*)

increased threefold." "I am," she concluded, "an author of some renown now but I still cannot express how much the *Change* article has benefited me."

Charlotte Mecke, who teaches a special English course called How to Survive in College, at Orange Coast College in California, was thrilled by the letters she had received from all over the country. "These are all little notes from human beings who do not attach themselves to an institution, and God knows where they found the article. I have mothers from Michigan writing about their daughters in college in Kentucky, asking me if I could please go to Kentucky and help their daughters.

"I received letters from the Department of the Army, the Rockefeller Foundation, and Security Pacific National Bank. They are writing me and asking me how I could help them. The bank wanted me to come and help them teach their employees how to follow directions. The Army wanted me to come and train their ROTC instructors." Asked how she would respond to these requests, she said, "Teaching is my love. I would have to take a leave, and I don't know if the district would give me a leave to do that. I think it would be exciting personal growth for me, but with a full teaching schedule, how could I travel?"

Requests for Information

A sample of Report readers who contacted a featured professor were asked in an open-ended questionnaire where they had heard about the project, what led them to request further information about a course or program, and what they did with that information. The responses yielded a picture of the spread of ideas about teaching improvement.

In virtually all instances the person who recalled having written for information was seeking to solve a specific learning problem or to alter a teaching method. Typical comments were: "I am in the process of developing a course of the type described." "I am always anxious to explore potential and fruitful new methods of instruction." "I am interested in teaching methods for my own improvement and because, as someone in education, I think I should be well informed. I am also interested in faculty development." "The description sounded interesting." "I was interested in the programmed instruction and in computer games." "The Report dealt with a plan for teaching the research paper in freshman composition; since most aspects of composition courses are notoriously difficult and success was reported with a particular technique, I believed I would learn something and in turn my students would profit." Some were led to request further information by "the attractiveness, relevance, and practicality of the Report." One professor said that he had requested information because the development of modules for a science course described in the article appeared to be a good model for his course in educational psychology and counseling.

Of the professors who wrote for more information, 53 percent passed on the information to someone else, usually to colleagues in their own departments, administrators, students, and members of their disciplinary associations. In most instances the requests for information were filled by printed material prepared by the professor.

One typical experience was that of James Allen of the department of geography at California State University, Northridge. He wrote to David Lanegran of Macalester College in St. Paul, Minnesota, whose article on urban geography had been published in the fourth Report, because it looked like the sort of approach that he could adapt to any location to illustrate various geographic themes and observations of landscape evolution. He received from Lanegran an "excellent and provocative outline and a highly detailed field trip guide to the city of St. Paul." He was impressed by the planning of the field trip and the sense of discovery stressed by each student. He made copies of the material and showed it to a few colleagues. "They haven't used it directly yet because of heavy workloads and because the materials are not directly applicable to Los Angeles," said Allen, "but it sure was inspiring."

Lester Basinet of the Community College of Philadelphia had read about the audiotutorial program developed at Purdue University by S.N. Postlethwait (Report #2) and was himself in the process of developing a similar program for instruction in introductory biology. What interested him was the evidence that encouraged Postlethwait to claim that students get persistently higher grades with his method. He received an enthusiastic reply from Postlethwait indicating that the evaluation was subjective and confirming the point that comparative evidence from controlled studies had not been drawn. To Postlethwait's excellent evidence of favorable student acceptance, Basinet supplied data showing increased learning with the method and used the information in a doctoral dissertation. In some instances, visits to the colleges were made by those seeking information, often with very good results.

A sample of more than 100 letters received by professors was analyzed for the distances from the featured program which they represented. Some letters traveled less than a mile (campus mail) while others came as far as 13,000 miles (from Australia). Eighty-nine percent of the letters came from out of state with a median distance of 652 miles, probably because visiting or telephoning was too expensive at that distance.

Report Distributors

Those who responded to *Change* Magazine's offer and requested multiple copies for distribution at

(*Continued on page 16*)

Report Distributors: Azusa Pacific College

Azusa Pacific College sits in the midst of a typical suburban shopping center at the base of the San Gabriel Mountains to the east of Los Angeles. Begun as a Bible college, the college changed its orientation in the mid-1960s when it merged with Los Angeles Pacific College and Arlington College. Currently its 80 full-time and 30 part-time faculty (all of whom still sign a statement of faith) aim for a balance between providing students with a Christian liberal arts education and preparing them to work in professional areas such as nursing, business, music, physical education, and teaching.

Faculty development at Azusa, directed by James Holsclaw, employs both teaching consultants and collective approaches such as seminars and workshops. The program budget is just over $70,000 per year, with almost half of that coming from a Lilly Endowment grant. Such a budget is none too generous for the ambitious program that Holsclaw has designed, and the fact that the Teaching Reports were available free of charge was a reason for his decision to use them.

When he received a letter from *Change* offering multiple copies of the Teaching Reports, his immediate reaction was, "I want to get this into the hands of faculty." He thought the models of excellence being presented would serve as an inspiration and be a catalyst to get teachers thinking about their own work and how they might improve it. He ordered 50 copies of each Report and sent one to every faculty member in the featured disciplines with a note from the faculty development center.

For this interview Holsclaw arranged a meeting with six members of the faculty to whom he had sent copies of the Teaching Reports. Our discussion centered on the reactions to the Reports. Dave Carlson, a professor in the biology department, limited his reading to the articles on biology in Report #2. One dealt with a modular program for handling an increased student load, which triggered his own search for other learning packages. He tried some and found them useful in giving students a preview of what would go on in the lab. He had looked through the Report's table of contents, found articles that he thought would be worth reading, and decided to skip the remaining articles because "the priority on my reading drops when it gets outside of my discipline." When an article did not meet his immediate need, it was put on the "to-be-read pile," where it stayed.

Fred Schackleton, a professor in philosophy, read the introductory article on philosophy by J.B. Schneewind, chairman of the American Philosophical Association's Committee on Teaching, because he knew him from conferences they had attended. The fact that Schackleton recognized the name of the person who wrote the overview led him to look with more interest at the articles in that section. He also read an article about Walter Coole of Washington state and soon after was at a conference at which Coole made the main presentation. This confluence of people he knew led him to take a greater interest in the Reports.

For Malcolm Robertson, who teaches psychology and religion, the articles reinforced some of the things he was already doing. Having moved from graduate to undergraduate teaching that semester, he had some serious questions as to how he could handle the large classes he was facing. In particular, the section on psychology provided valuable insights for relating effectively to students in a large group. That perspective led him to conclude that the techniques a teacher uses are less significant than "where he is coming from, how he cares about the students, and his desire to really help them learn and inspire them." Others agreed that one of the most beneficial themes presented in the Reports was that teachers seemed to care for students as individuals.

The Azusa faculty did not seem to be aware that a major purpose of the articles had been to celebrate teaching improvement. They viewed them strictly as sources of information, which was given a low priority when not specifically relevant to their own work. Had they viewed them as Holsclaw intended (as models of excellence), they agreed they might have read them more diligently. Dave Kirk, who teaches in the education department and works as a teaching consultant to other faculty, said that he would have reacted differently to the articles had he known they were intended to celebrate teaching improvement. "We are critically interested in training teachers," he said, "and the information would serve a useful purpose."

None of those present had discussed ideas in the Reports with their colleagues. This contrasted sharply with their reaction to a series of films highlighting great teachers, which had been presented at earlier faculty meetings and had generated a lot of discussion. One faculty member attributed the different reaction to "an idealistic streak" that held his interest in the films but not in the Reports. "I wanted the Reports to challenge me, to be more provocative. When I am interested in thinking about teaching and in developing models, I want to follow the best." Professors presented in the Reports seemed to him too typical.

After the meeting Holsclaw was somewhat disappointed. He had hoped that the faculty would see the *Change* Reports as examples of excellence, that they would give to faculty "models on the cutting edge." What he had heard from his faculty was that they had not read them or had simply glanced through, picking and choosing specific techniques that had been of immediate help. They did not perceive the teachers featured in the Reports as being extraordinary. He had wanted faculty to make these Reports part of their discussions, but the impression he received from the conversation (which was in fact the first evaluation he had done of the impact of the Reports) was that faculty had done so only rarely and never formally. At the end of the discussion, one of the professors commented, "Now that you've come to talk with us about the Reports, I'll make it a point to go back and read them more carefully."

Perhaps national mass distribution requires a kind of traveling salesman, someone to meet with recipients and ask for their opinions of what was distributed. Finding out that faculty had not read the Reports thoroughly may not be as important as making them aware that someone is interested. Personal contact may be the catalyst for generating interest.—JBF

(*Continued from page 14*)

their institutions were interviewed by telephone or were asked to respond to an open-ended questionnaire about their reactions. They had very much the same expectations and hopes for the Reports that the project staff had—that the Reports would contribute to the national debate on teaching, stimulate discussion, raise the level of consciousness about teaching, and lead some faculty to try new approaches.

A majority of those who distributed the Reports within their institutions were impressed with them and hoped that *Change* would continue to publish them after the project ended. As one commented, "The Reports are worth doing, information is extremely important, and there should be incentives for faculty to report their ideas outside of the formal award system." Another hoped *Change* would continue the project because it is "a primary way to put models of excellent teaching in the hands of professors." To most the Teaching Reports represented "the same first-rate job that *Change* has always done," and though one felt that *Change* had become more staid and more establishment-oriented since the 1960s, most of those who distributed the Reports had been supporters of *Change* before the project and, if anything, continued to be.

Given their expectations, it is significant that for the most part the distributors were unable to describe clearly the impact the Reports had. One distributor, a provost at a small liberal arts college in the Northeast, commented that he received from faculty a "vague approbation and a sense of having somehow kept up with a few things but very little sense of having been inspired to the point of action, much less change." He believed that the reaction resulted "from the very broad range of innovative practices covered and from the lack of any single point of view vis-à-vis those new practices." The

Report Distributors: Stanford University

Whatever Stanford does, it does intensively, including participating in the Teaching Improvement Project. Three Stanford professors were featured in an article in the Reports; another who served as liaison for the economics disciplinary association wrote an overview article; and the Center for Teaching and Learning mounted an extensive program for distributing and using the Teaching Reports.

Funded by the Danforth Foundation, the Center for Teaching and Learning was begun to help the Bay Area colleges and universities in California. Its primary concerns are fostering cooperation and exchange among the institutions by conducting workshops for both new faculty members and those in mid-career. Center director David Halliburton is a professor of English, modern thought, and comparative literature who in recent years has become involved in the faculty development movement.

Under Halliburton's leadership, the center seems to have substantial influence with the Stanford faculty, who serve as its resources. Because he is affiliated with the English department rather than with the education department or an educational research center, Halliburton can maintain close ties with his own department and with faculty in other disciplines. He approaches the problems of faculty development and teaching improvement from an intellectual standpoint, and is somewhat contemptuous of gimmicky technology and expensive audiovisual innovations, which "are almost never used for the purposes for which they are intended." In contrast, he prefers to focus on direct interaction with faculty, engaging them in careful consideration of their work.

The center requested 100 copies of each Report. In addition to being used for the Danforth workshops, they were distributed to faculty whose disciplines were featured. The procedure for this involved a memorandum sent by then associate director Jean Fetter from the center to faculty members in the discipline offering them the opportunity to receive a free copy of the *Change* Report, which contained "analysis of some of the most notable improvements in American undergraduate teaching." Less than a month after Report #2 was distributed, it became necessary to send a second memorandum indicating that the demand for the *Change* Report had been greater than the supply and asking that faculty borrow copies from colleagues.

There has, however, been no spontaneous comment on the Reports from Stanford faculty and as yet no concerted attempt has been made to ascertain their reactions. Michele Fisher, the new assistant director of the center, asked some faculty about the Reports informally. She learned from the economics department that "when the Report came out it was widely read in the department and was a subject of conversation." In addition, a student in a course for teaching assistants had "read the report and found it useful."

On April 15, 1977, a center workshop held at Stanford for Bay Area faculty used as its discussion basis Report #3, which featured economics, philosophy, and mathematics. Halliburton said he used the Reports because he thought their quality was high and the ideas on teaching were fresh. He hoped that by using the Reports he could raise the consciousness of the faculty participants, focus their questions on new ways to approach teaching, and give them something concrete on which to base their discussions. The conference began with a panel presentation followed by three concurrent workshops that featured deeper discussion based on the Reports.

Michael Bratman, a young professor of philosophy, was a copresenter at the conference along with James Friedman of the University of Santa Clara. He reported that many conferees were not very impressed with what they had read and commented that there wasn't much substance in the Reports. As a result, the discussion veered off to more general topics.

Although Bratman assessed the workshop as being only marginally successful, he did think that bringing faculty together to share experiences and gain support from each other was valuable. The *Change* Reports, he said, served as a catalyst for discussion though the conference did not focus on them.—JBF

dominant impression, though not documented by specific examples, was that most of the distributors were not sure what impact the Reports had, and they had not formally collected information on it. One distributor who had hoped for greater cooperation from his faculty in structuring curriculum and teaching as a result of the Reports found that "as always with this college, my expectations were dashed to the ground."

One dean of instruction, who coordinated the distribution at his liberal arts college, was highly in favor of the concept of the Reports, feeling that the idea was good, had tremendous potential for providing information on teaching, and was needed as a facilitator of change. He felt that another 100 copies, which he could not get because of *Change*'s 200-copy limitation on distribution, would have made a significant difference in the kind of distribution he could have carried out. He felt as well that there was a definite need for some kind of follow-up to help those receiving the Reports make better use of them.

The following examples illustrate the various ways in which the Reports were used:

After faculty read the Reports, plans to alter a curriculum at one liberal arts college were modified drastically to stress teaching.

A small grants committee at a large university used projects mentioned in the Teaching Reports as models. Projects similar to those in the Reports were more likely to be funded.

At one state university in the Northeast, the Reports are used as source material for doctoral students studying the teaching-learning process in a department of higher education. At another major graduate center, the Reports are distributed routinely to graduate teaching assistants who use them as resources for improving their own teaching.

The central administration of the State University of New York distributed the Reports to persons who had received teaching awards or faculty grants for improving instruction.

The University Center in Virginia, a consortium of 15 area colleges, held a series of seminars for its member institutions, using the Reports as resource material. Each seminar ran for a full day and included discussions based on each article in the Reports. "No other seminar we have held," center director Kenneth Erfft said, "came near providing the stimulation and participation in discussions of teaching as have these first two Reports."

The Great Lakes Colleges Association distributed the Reports to its 12 member institutions, which passed them on to faculty at individual campuses.

Conferences on teaching improvement at New York University and a conference on educational computing in minority institutions requested copies of the Teaching Reports for use in their activities.

Extended case studies of the impact of distributing multiple copies of the Reports (Stanford University and Azusa Pacific College) further illustrate the project's impact.

The Readers

The information presented here is derived largely from an analysis of approximately 500 returns to a structured mail questionnaire filled out by those who received the Reports through subscribing to *Change*, requesting a single copy, or from someone who distributed copies within an institution.

As Table 2 shows, the largest proportion of recipients typically read only the articles in their own disciplines (45%). Twenty-three percent reported having read a few scattered articles throughout the Reports, and 21 percent reported having skimmed the articles. It was unusual for an individual to read only one article (3%) and only a small percentage read all the articles (8%). Some important differences occurred among different groupings. Those holding joint faculty/administrative positions tended more than other groups to skim the Reports (29%), to read a few articles (30%), or to read all ar-

Table 2

Reading of the Report Articles*

	Skim	One	Few	In Discipline	All
	%	%	%	%	%
ALL RECIPIENTS	21	3	23	45	8
Position					
Faculty	20	3	23	48	7
Administrator	17	6	12	54	10
Joint	29	3	30	22	16
Rank					
Lecturer/Instructor	11	2	21	60	7
Assistant Professor	17	3	26	48	6
Associate Professor	19	5	17	54	5
Full Professor	23	4	19	43	11
Field					
Natural Sciences	19	4	19	50	8
Humanities	15	4	20	56	4
Social Sciences	20	3	17	51	10
Professions	29	3	33	24	12
Institution Type					
Public	20	2	23	43	12
Private	21	4	23	46	5
Institution Size**					
Small	30	4	24	38	4
Medium	19	5	20	48	8
Large	17	1	23	49	11
Giant	15	2	29	44	10
Super	32	3	16	35	14

*Percentages may not equal 100 due to rounding.

**These categories are taken from Harris, Seymour E., *A Statistical Portrait of Higher Education*. New York: McGraw-Hill, 1972, pp. 62-68.

ticles in the Reports (16%). Fewer of these individuals read articles in their disciplines, suggesting that those holding joint faculty/administrative posts were more attuned to looking across disciplines for information about teaching. Those holding only administrative posts tended more to read articles in their discipline (54%), suggesting that it is through their disciplines that administrators remain in touch with the academic world.

Significantly larger proportions of those in the professions, such as engineering, law, or education, skimmed (29%) or read a few scattered articles (33%), and relatively fewer read all articles in their discipline (24%) as contrasted with those identifying with the natural sciences, the humanities, or the social sciences. This suggests that faculty in the professions tried to draw information from a number of different fields for use in their own work. Recipients split almost 50/50 on the intensity with which they read the Reports. Fifty-three percent read them with the intensity similar to reading a professional book, and 47 percent said that they read them as they would read a novel or a popular magazine. The sharing of the Reports with colleagues (a primary objective of the project) continued informally 68 percent of the time, as shown in Table 3: Twenty-five percent passed the Reports on to others, 36 percent discussed ideas in the Reports, and 4 percent wrote and 3 percent circulated something about the Reports.

Faculty more than administrators or persons holding joint appointments tended not to share the Reports (40%), whereas administrators tended more to pass them on to others (40%); and those holding joint administrative/faculty positions tended to discuss ideas more with others. It appears from this that again the joint position of faculty/administrator (likely the head of a teaching improvement center) is a key to distributing materials about teaching. A higher percentage of recipients in the social sciences did not share the Reports (42%), while those in the professions tended more to discuss ideas in the Reports with others. Even though no professional fields were specifically represented (except music education), the recipients of the Reports who identified themselves with a profession seemed to make substantial use of them. This suggests that ideas about teaching constitute an important benefit professionals can derive from academic disciplines.

There appeared to be little difference between recipients in public and private institutions. Those from small institutions, however, tended to share the Reports less (49%) and to discuss them less (23%) than recipients at larger institutions. Full professors tended to pass the Reports on to others (35%) and to discuss them less (25%), while lecturers and instructors exhibited a reverse trend.

There appears to be a strong relationship between the intensity with which the Reports were read and the extent to which they were shared. Those who skimmed them as they would a novel or a popular magazine tended to share them less (38%), whereas those who read them with a greater intensity tended to share them more (45%).

Forty-six percent of the recipients reported that no activities occurred at their institutions as a direct or indirect result of the Reports. Thirty-eight percent noted informal discussions about teaching; 8 percent said policy changes with regard to teaching had occurred; and 7 percent referred to other activities such as conferences and fund-raising efforts for teaching. While no differences across subgroups were statistically significant, it appeared that of the four different disciplinary groups represented, those in the natural sciences tended to have more informal discussions (44%), while those in the social sciences appeared to have fewer. Further studies of relationships among the different groups are being made.

Recipients of the Reports expressed overwhelming agreement that mass distribution was an effective way to disseminate information on teaching improvements. Seventy-two percent of those responding held such a view. Those in the social sciences (64%) and humanities (65%) held that attitude less than did those in the natural sciences (77%) and the professions (80%).

Table 3

Sharing of the Reports*

	Did Not Share	Passed to Others	Discussed	Wrote for Information	Other
	%	%	%	%	%
ALL RECIPIENTS	32	25	36	4	3
Position					
Faculty	40	20	34	3	3
Administrator	16	40	33	8	4
Joint	19	29	43	6	4
Rank					
Lecturer/Instructor	40	12	45	3	0
Assistant Professor	44	20	28	3	5
Associate Professor	31	21	43	4	2
Full Professor	30	35	25	7	4
Field					
Natural Sciences	33	28	30	6	4
Humanities	31	26	37	3	2
Social Sciences	42	19	31	5	3
Professions	24	26	41	4	5
Institution Type					
Public	29	26	37	5	4
Private	36	24	34	4	3
Institution Size**					
Small	49	26	23	1	1
Medium	28	28	36	5	3
Large	36	16	39	8	1
Giant	24	26	42	3	4
Super	26	29	32	5	8

*Percentages may not equal 100 due to rounding.

**These categories are taken from Harris, Seymour E., *A Statistical Portrait of Higher Education*. New York: McGraw-Hill, 1972, pp. 62-68.

Reactions to the Quality of the Reports

Those who received and read the Reports were asked to comment on their quality. In the opinion of most respondents, the quality of the Reports was good to excellent. The usefulness of the Reports, their layout, the technical sophistication and conceptual level of the discussions of teaching, and the overall quality of the Reports—all were rated good to excellent by at least 73 percent of the recipients.

From the open-ended comments made about Report quality came several criticisms and recommendations as to what to do "next time." Several people commented that they thought the Reports were obsolete, that the techniques highlighted were really no more effective than traditional approaches, or that teaching could not be improved by techniques as much as by enthusiasm and charisma. There was some call for improvements in the design of the articles and for more research evidence to support the worth of the approaches featured. There were also comments about the way in which the Reports might be helpful to professors. Some were pessimistic, indicating a belief that professors wouldn't change even though the Reports were available. Others commented that the Reports would have little if any impact, or that they had to be combined with administrative support in order for positive change to take place. But many thought that they should be continued, that they contained generally good variety, or that, as two respondents put it, "It's a start and we must keep trying."

Twenty-eight percent of the Report recipients indicated that their view of *Change* Magazine had been modified as a result of the Reports; they now saw it as more practical and useful to faculty in areas of day-to-day concerns. A much larger proportion of those in the professions (40%) than in the social sciences (19%) held that view, suggesting a potential new readership for *Change*. Only 5 percent of all recipients began a subscription to the magazine as a result of the Reports. Comments from Report recipients indicated that, for the most part, their opinions of the magazine had been positive before publication of the Reports and simply remained so. "I've always found *Change* Magazine useful and stimulating," said one. "These Reports merely confirm my high opinion." Positive comments exceeded negative comments by a wide margin. Most of them centered on the practicality and specificity of the Reports.

In summary, it appears that the Reports on Teaching attained a high standard of excellence, a standard already associated with *Change*. The care with which they were prepared both substantively and technically met *Change*'s own standard. Throughout the project, feedback was actively sought and constructively used, a kind of formative evaluation that seems to have been worth the effort.

Sixty-seven percent of those who received and read the Reports thought it was a good or excellent idea to have writers author the articles. However, those in different disciplines had other views. In the humanities, 56 percent believed this policy was good or excellent, a full 10 percent lower than the average, whereas almost 80 percent of those in various professions thought that using education writers was a good or excellent idea. Report recipients holding administrative posts were more in favor of having education journalists do the articles (84%) than were those holding faculty positions (63%).

In a very few instances dissatisfaction was expressed by readers of the Reports and by featured professors that education journalists were chosen to investigate and write about the programs rather than the professors involved in them. Criticism came from those who thought that the education journalists simply did not know enough about the discipline to detect what was unique and important in a teaching project. One head of a teaching center who had requested multiple copies of the Reports for distribution commented that the use of professional writers raised some doubts about the credibility of the articles. "The minute you have a free-lance journalist," he said, "the bent is more popular than professional." Another thought that although articles written by professors themselves would need editing, "no one talks about a project quite so well as one who has been involved."

Assigning independent, professional writers rather than someone directly involved with a program was consonant with *Change*'s overall editorial policy and fulfilled the original intent of the project to have programs evaluated and described by outside reporters. As George Bonham put it in the third Report: "I for one prefer the trained eye of an outside journalist to the cold analysis of a fellow pedagogue, for good teaching remains an art and not a science." There was a sense on *Change*'s part that professional journalists would be better able to translate the characteristics of programs for readers in different disciplines and thus facilitate cross-fertilization of ideas on teaching among the disciplines, something the disciplines had not been able to accomplish even within their own ranks.

More serious dissatisfaction was expressed by a few journalists when featured professors read and reacted negatively to a draft of the article before final editing. A procedure common to scholarly writing, such prior review by the subject of an article is highly atypical and even questionable in the realm of investigative reporting. The journalists' view was that they as investigators had been given an assignment to report objectively what they saw, and that the credibility of the effort would be enhanced by presenting programs "warts and all."

Change's view was that elements in the featured professors' work, in order to be effectively used by others, would have to be specific and accurate, and it

was thought that the professor himself was in a better position to determine whether this had been achieved. The second, more important point was that the professors often felt themselves to be in rather sensitive political positions. They were unwilling to have a totally "objective" presentation made of their programs because experimental and innovative programs often displease some students, and the mere reporting of this displeasure (since student reactions played an important part in the descriptions) could be used as a political weapon against the programs. Occasionally teachers proved highly sensitive to this problem, even paranoid; and *Change* sought to reduce their anxiety as much as possible. Finally, it was the clear intent of *Change* to present these examples of teaching improvement in a positive light, since national publicity was meant to be a form of reward for having been selected. It seemed incongruous to award national publicity and in the course of a public description to say things about a program that would lead others to denigrate its importance or its effectiveness.

In a few instances (very few in view of the large number of articles that were written) professors found themselves displeased with the results, concerned about the possible repercussions of comments that were included, and determined that the article should not be published without modification. In those instances, professors asked for the specific deletion of paragraphs that they thought would be misleading or negative. In only 2 out of the 100 or so articles that were written did the controversy reach serious and unpleasant proportions. These cases and all others where disagreement occurred were eventually resolved amicably. All commissioned articles were published, and virtually all reporters and professors indicated that they were satisfied with the process and with the outcomes.

The controversy is worthy of mention only as an illustration of a dilemma with wider implications. *Change* seems to have walked a tightrope between its norms as a neutral, independent commentator on the academic scene and those of the disciplines for whom open communications and the opportunity to constantly revise and refine one's work are of the utmost importance. On the one hand, *Change* decided that professors should not write about their own programs because they might tend toward self-aggrandizement at the expense of objectivity. But at the same time, *Change* intervened to control and limit its writers so that little real criticism was included.

Impact on Report Recipients

Recipients of the Teaching Reports were asked whether they had found any useful ideas about teaching in the Reports. Seventy-six percent said that they had. Of these, 40 percent discussed the ideas with colleagues; 8 percent requested more information; 13 percent suggested that others try the ideas; 25 percent planned to incorporate the ideas into their teaching; and 16 percent were actually using the ideas, trying them out in new courses or curricula or using the Reports to help counsel students about innovative programs to which they might transfer. Only 18 percent of the recipients felt that there was a greater awareness of teaching improvement at their institutions as a result of the Teaching Reports; 16 percent felt there was not; and most (65%) simply did not know.

Asked if the Reports generated a greater exchange of ideas on teaching, 21 percent said yes, 25 percent no, and 55 percent did not know. Forty-seven percent indicated that they had participated in informal discussions on improving teaching as a result of the Reports, while 28 percent indicated that their own teaching had improved as a result of the Reports. The only difference of any magnitude in responses by discipline was that more respondents in the professions (40%) than in the humanities (24%) and the social sciences (22%) indicated that their teaching had improved. A similar percentage (24%) indicated that they had observed an interest in improved teaching as a direct or indirect result of the Reports. A significantly higher proportion (38%) of those holding administrative posts reported that they had observed increased concern, more frequent discussions and use of consultative services, and actual implementation of new approaches.

One hundred and four recipients commented that their own teaching had improved: 73 were able to describe the improvement; 22 thought that their teaching had improved but not as a result of the *Change* Reports; and 9 believed that their improvement had occurred prior to the Reports. The largest number of those who were able to identify the improvement cited changes in their way of presenting materials—most often a move away from traditional lectures toward greater individualization and the use of audiovisual media, computers, and resources in the community. Those who retained the lecture format were more flexible in it and had improved their lectures by greater class participation. "Coming out from behind the lectern" allowed these professors to help students follow their thoughts and to make themselves accessible via "active solicitation of student input as part of the lecture itself."

Several respondents saw changes in their relationships with students. One claimed that his teaching had become more student oriented. Another proclaimed "a better blending of humanistic qualities with technical expertise as they pertain to student direction has occurred and will continue."

The Funding Agency

According to David Justice, the program officer at the Fund for the Improvement of Postsecondary

Education who was in charge of the Teaching Improvement Project, the articles on improved teaching reinforced the overall purposes of the Fund. He cited the view of one member of the FIPSE board of advisors who pointed out that the fact that teaching improvements were going on in "lots of different places and lots of different disciplines" seemed to underline the message that the Fund was sending by the very act of supporting individuals, institutions, and agencies seeking to improve teaching and learning. In a more indirect way, observed Justice, the *Change* project may have provided a stimulus that has led to a noticeable increase in proposals to FIPSE from disciplinary associations, proposals that deal with teaching as well as scholarship.

Change Magazine

Of the effect upon *Change* Magazine, third-year project director Joan Stableski said that "we anticipated a lot more public response." The *Change* staff had hoped that subscriptions to the magazine would rise, since the Reports were reaching a new clientele (the disciplines). But it soon became clear that no increase could be expected, since people were receiving a publication totally different from the regular issues of *Change*.

However, Stableski said that because of the project *Change* had moved into a new area of funding, namely from the federal government. The complexity of forms and proposals had increased over what was necessary when private funding was sought. That, and the burden on the *Change* staff of producing 12 issues per year instead of 10, had generated "a lot of growing pains."

This interview with Change Magazine's editor-in-chief, George W. Bonham, was conducted by telephone on the afternoon of April 12, 1978, and was subsequently edited for accuracy and completeness of views.—J. Bruce Francis

Where did the original idea for the Teaching Improvement Project come from?
The idea was a response to the continuing frustration among the more than 500,000 teaching professionals in this country who were largely unaware of effective instructional methods being employed on various campuses. I once spoke with Sam Baskin of Antioch about all the innovation conferences held during the 1960s. I added up the attendance at the major ones in a single year, and I remember saying to Sam that at that rate it would take something like 430 years to get around to every faculty person in the country. I doubted that many of them would still be around. We concluded that we simply had to deal with these important issues on a mass basis.

What purposes did you originally have in mind for the project?
We had three purposes in mind: First, we wanted to pay symbolic attention to the importance of good teaching. Featuring it in this way would serve as a counterpoint to the overshadowing value placed on scholarship in promotion and tenure decisions. Second, rather than talking theoretically about pedagogy, curricular change, and the whole question of intellectual relations with students, we wanted to present concrete examples, not to be duplicated but to be adapted to the teacher's own needs. Third, we wanted to involve the disciplinary associations. They are still the arbiters of academic success and failure, and serve many important functions, including the improvement of teaching.

What has been accomplished within the disciplines?
It varies a good deal. In 3 or 4 of the 15 major fields we examined, the collaboration has been distinguished. In about 8 others our work together has made little or no difference. In other words, they were glad to work with us, but I have not seen any follow-through. In no more than three, I would say, was our effort really a complete failure. Where it was successful, that success was political in the sense that teaching as an activity is now generally recognized in the disciplinary association—at annual meetings, workshops, and regional teaching programs.

Our effort, successful or not, is unprecedented. The scholarly disciplines are a different world. You can imagine that, for a scholarly society, working with the mass media generates certain suspicions and hostilities. Those were on the whole overcome, though it took a while.

In your proposal to FIPSE, you said that undergraduate teaching remains in "dire need of overhaul in its content, methodology, and strategies." Have your views changed in the course of the project?
Not very much. It must all sound like a broken record. I'm amazed I said that at the time; I'm rarely that farsighted. I believed—and still do—that what we need is a kind of curriculum manifesto for faculty to think very hard about making some basic fields like philosophy exciting for students again. In addition, there's really not very much professional payoff for teachers to teach better. Despite teaching awards, there is still too much evidence that when it comes to the crunch of a tenure decision, it is really only scholarship and publication that count.

What do you see as the project's accomplishments?
I will try to speak to this in a modest sense. For many of the people written up it accomplished a kind of national recognition. Often there was a great to-do made of their being featured—presidential citations, dinners, and so on. There is also direct evidence that a few disciplines, having been through this sausage

grinder with us, either intend to duplicate this effort in some form or will have a more formal activity aimed at the improvement of teaching.

Now, in terms of the overall impact, whether we have really stimulated teachers to try harder, or even to be more emotionally open to possibilities of teaching improvement, is almost impossible for me to say. It's all anecdotal and very hard to pin down. But I know there is a good deal of awareness of it.

In what ways have you been disappointed?
I should like to have seen more evidence of open-mindedness among teachers in regarding themselves as open to improvement. I also haven't seen much evidence that good teaching now is better rewarded than it was a few years ago. It is difficult to be scientific about measuring the impact of this program. It certainly has had no effect on our subscriptions.

Will Change *be carrying on its effort in relation to teaching?*
Yes. We remain committed to improving teaching effectiveness, yet we are uncertain as to how we will fulfill this commitment. We are currently trying to work out either a special section or a column that will supplement our 8 or 10 regular columns, featuring the issue of pedagogy. We also intend to publish other special issues that will deal not with the quality of teaching but with teaching content. We hope to work with the scholarly disciplines in offering one or two invitational conferences dealing with the content issue. This may well lead to the publication of a book. We are currently producing a book out of the six Teaching Reports.

METHODOLOGY

Heuristic evaluation draws upon multiple forms of information from multiple sources. Every attempt was made, within the limits of time and resources, to identify as many different perspectives on the Teaching Improvement Project as possible and to seek information about each perspective in the most efficient and effective way. Our approach has been to treat the evaluation not as a controlled experiment or a field investigation or an audit but as an exercise in analytic induction, a learning process in which we operated heuristically rather than algorithmically. The difference between the two approaches lies in the flexibility with which questions are asked, data gathered, and inferences drawn.

Algorithmic approaches, such as experimental or quasi-experimental studies using careful controls or even straightforward sample surveys, are committed to a method, a set of mathematical and/or logical rules decided upon in advance, which, if rigorously applied, will yield answers to specific, preestablished questions. Heuristic approaches, on the other hand, begin with more general questions and a flexible array of methods. Then as data accumulate and potential answers emerge, several lines of inquiry and analysis are followed simultaneously to draw a more comprehensive picture. The ultimate result is an analytic description and an interpretation, an explication of what has been learned.

Quantitative data, sampling methods, and statistical analyses were not ignored, but neither were unstructured interviews, document analyses, and case studies. The approach was to use as many different methods of examining different aspects of the program as possible from as many viewpoints as time and resources permitted.

Table 4 gives a numerical breakdown of types of information items examined during the course of the evaluation. Documents, including proposals, memoranda, and correspondence, were examined for ideas about the background and implementation of the project as well as for reactions to it. Unstructured questionnaires were sent to all professors featured in the Reports (60% response rate), to a sample of those who requested information from a featured professor (54% response rate), and to all article writers (76% response rate). These open-ended questionnaires sought written reactions to the project. Personal and telephone interviews with those who distributed multiple copies of the Reports, with featured professors, with members of the project staff, and with the advisory board were used to explore in greater depth the overall issues of the project, while site visits contributed to a sense of how the project was viewed and implemented.

Several case studies were made of individuals and institutions whose involvement with the project was more extensive or particularly revealing. Subjects for the case studies were chosen on the basis of information gleaned from the open-ended questionnaires and from telephone interviews. Site visits or lengthy

Table 4

DATA SOURCES	FORMS OF DATA* Documents Letters, etc.	Telephone Interviews	Personal Interviews	Unstructured Mail Survey	Structured Mail Survey
Teaching Report Articles	116				
Project Staff	11	1	7		
FIPSE	2	1	1		
Disciplinary Associations	18	8			
Project Advisory Board	24	4	4		
Article Writers	5			19	
Featured Teachers	125		11	65	
Individuals Requesting Information	200	8		85	
Report Distributors		65	15	71	
Report Recipients			30		496
TOTAL	501	87	68	240	496

*Numbers are data items actually examined. Response ratios to the surveys varied, and they are reported in the text.

telephone discussions yielded specific information about how the Reports were used (in cases of those who had distributed multiple copies), or information about the impact of having been written about (in cases of professors featured in the Reports). A structured questionnaire was sent to Report recipients asking about the number of Reports received and their source, the amount and intensity with which they were read, their quality, the extent to which they were shared formally and informally, and whether or not they affected teaching attitudes or behavior.

Three different groups received the structured questionnaire, each by a slightly different process. The first group was a random sample of 100 persons who had written to *Change* requesting a single copy of the Report (63% response). The second group consisted of faculty in a random sample of institutions to which multiple copies of the Reports had been sent. The person in each institution who had distributed the Reports was asked to send the questionnaires to a representative sample of those to whom the Reports had been distributed. Ninety-five different institutions were sampled in this way (67% response rate). However, the number of questionnaires returned from each institution, despite follow-up letters and phone calls, remained small. Thus, any generalizations about this group must take into account the limitations of this cluster sampling method, recognizing that each institution is represented, on the average, by relatively few respondents. From the third group, a random sample of 500 *Change* subscribers, only 18.4 percent responded; generalizations about this group would be uncertain.

There is little or no justification for assuming that the 496 persons who responded to the recipient questionnaire are typical either of academics in general or even of all those to whom the Reports were sent. Rather it is more likely that they represent those who were more aware of the project and therefore more oriented toward teaching. Most respondents were faculty (64%) at medium-size institutions (37%). They divide almost equally among the disciplinary groupings and between public and private institutions. The largest numbers came from the far West (20%), the Southeast (16%), the Mideast (16%), and the plains states (14%).

Response rates for the mail questionnaires, while providing relatively adequate coverage of the different institutions requesting multiple copies of the Reports, were still not as high within institutions as we would have wished. This was true despite extensive effort and follow-up by mail and telephone to those who had distributed the questionnaires. We were forced to conclude that the procedure of having the person who distributed the Reports also distribute the questionnaires was not totally effective. A better procedure would have been to ask each distributor for the names of those to whom Reports had been distributed and then to have approached them directly. While we might not have secured a substantially better individual response rate, we could perhaps have made a better estimate of the characteristics of those who did not respond, resulting in more generalizable inferences.

The questionnaire data were analyzed to yield simple percentages for the entire group and cross-tabulations by subgroups of the different demographic categories. Only in cases where an observed relationship would occur by chance fewer than 5 times in 100 (as shown by chi-square) are differences among subgroups discussed in the text. Additional composite analyses were made of items dealing with the quality of the Reports.

The six questionnaire items assessing recipient responses to different characteristics of the Reports were combined into a single index of quality after all were shown to be reasonable indicators of a single construct. As shown in Table 5, factor analysis of the six items yielded a single general factor on which all items loaded substantially.

Items contributing most to the construct (i.e., having the highest correlations with the factor) are those dealing with the technical sophistication and level of conceptualization of the Reports; while those

Table 5

Elements of Quality Index
(N = 366)*
Excellent (1)——Poor (4)

Report Characteristics	Mean	SD	Loading**
Usefulness of articles for improving teaching	1.94	.7	.67
Policy of having articles written by education writers rather than teachers featured	2.25	.8	.56
Layout (graphics, style, photographs, etc.)	1.97	.6	.49
Technical sophistication of description of pedagogy	2.06	.7	.78
Level of conceptualization about teaching/learning	2.06	.7	.80
General quality of writing	1.79	.6	.73

Percent of Variance Accounted for = 55%
Factor Eigenvalue = 3.27

Index (Quality) = SUM of Item Ratings/Number of Items
Total Group Mean = 12.08 SD = 3.03

Group Differences***	F	P	Nature of Differences
By Discipline	2.6	.05	Professions (+)
By Rank	1.7	.17	Not Significant
By Positions	8.0	.0004	Administrators (-)
By Public/Private	2.1	.15	Not Significant
By Intensity	5.3	.17	Not Significant

*Includes only respondents who rated all items.
**Alpha factor analysis with NO rotation.
***Significance of group differences tested by analysis of variance.

contributing least include the layout and the fact that the Reports were written by education writers. This suggests that while readers judged quality on the basis of all six Report dimensions, the most important aspects were those dealing with the substance of the Reports rather than their appearance or how they were produced. It seems reasonable that the Report's news-magazine appearance (which led a few to disdain its "slickness") had less influence on readers' perception of quality than did the content.

The quality index was constructed by summing the individual ratings for each item and dividing by the number of items. Analysis of variance was used to test differences among demographic subgroups.

Summary

The data of the project do not speak for themselves. Rather, they must be interpreted through examination of quantitative and qualitative information in the light of larger analytic constructs. These constructs derive, appropriately, from the categories of criteria that *Change* introduced in its selection of teaching improvements: *Immediate criteria*, the sense of the experience, include the feelings of those involved in each phase of the project and their general attitudes about its success or failure.

Intermediate criteria, the logical relationship between choice of procedures and objectives sought, include the appropriateness of the project selection procedures, the methods whereby courses were examined and described, the quality of the Reports, and the appropriateness of distribution methods.

Ultimate criteria, the concrete effects of the project (whether intended or not, anticipated or not), include the extent to which the Reports were distributed, discussed, and used; the extent to which ideas about teaching were influenced by them; the extent to which teachers were affected by having been featured or having received a Report; and the extent to which higher education's attention to teaching has been affected.

While it is clear that some of these effects must be inferred from survey-type data and hence are subject to their natural limitations, our inferences assume, as surveys must, the capacity and willingness of those involved in the project to observe their own reactions and behavior and to report them with reasonable accuracy.

Heuristic evaluation is not slavishly constrained by preestablished rules that determine the confidence with which one can draw conclusions. Rather, it defines rigor differently, as a conceptual rather than procedural characteristic. Algorithmic approaches view human involvement in investigations as biasing at best and contaminating at worst, and they use procedural rigor to remove human judgment as much as possible once the initial design has been completed. Heuristic methods, on the other hand, recognize the power of human judgments to distinguish the crucial from the trivial and to make inferential leaps from clues only subtly suggested by the data. Judgment is considered to be the evaluator's most important analytic tool, and rigor is the discipline of human judgment that enhances rather than diminishes its power.

Rigor, therefore, involves the use of multiple forms of data so that the weaknesses of one form can be offset by the strengths of another. Rigor also involves gathering data from multiple perspectives and comparing and contrasting those perspectives to achieve a clearer and more complete picture.

Though more precise technical terms could be found to describe heuristic evaluation, none would be more generally accurate than that it is a form of learning, high-level learning that is a part of every professional's daily life. We have sought during this inquiry in every way open to us to learn as much about the Teaching Improvement Project as we could, to try out ideas and abandon them when there was insufficient support for them, and to change emphasis as contrary or clarifying information appeared. This evaluation expresses what we have learned in as open and straightforward a manner as possible. We take full responsibility for the descriptions of what we found and the inferences we have drawn from them, knowing full well that others may disagree and that we may in fact have been wrong. As with all evaluations, such an attitude is critical if an adequate picture is to emerge. ■